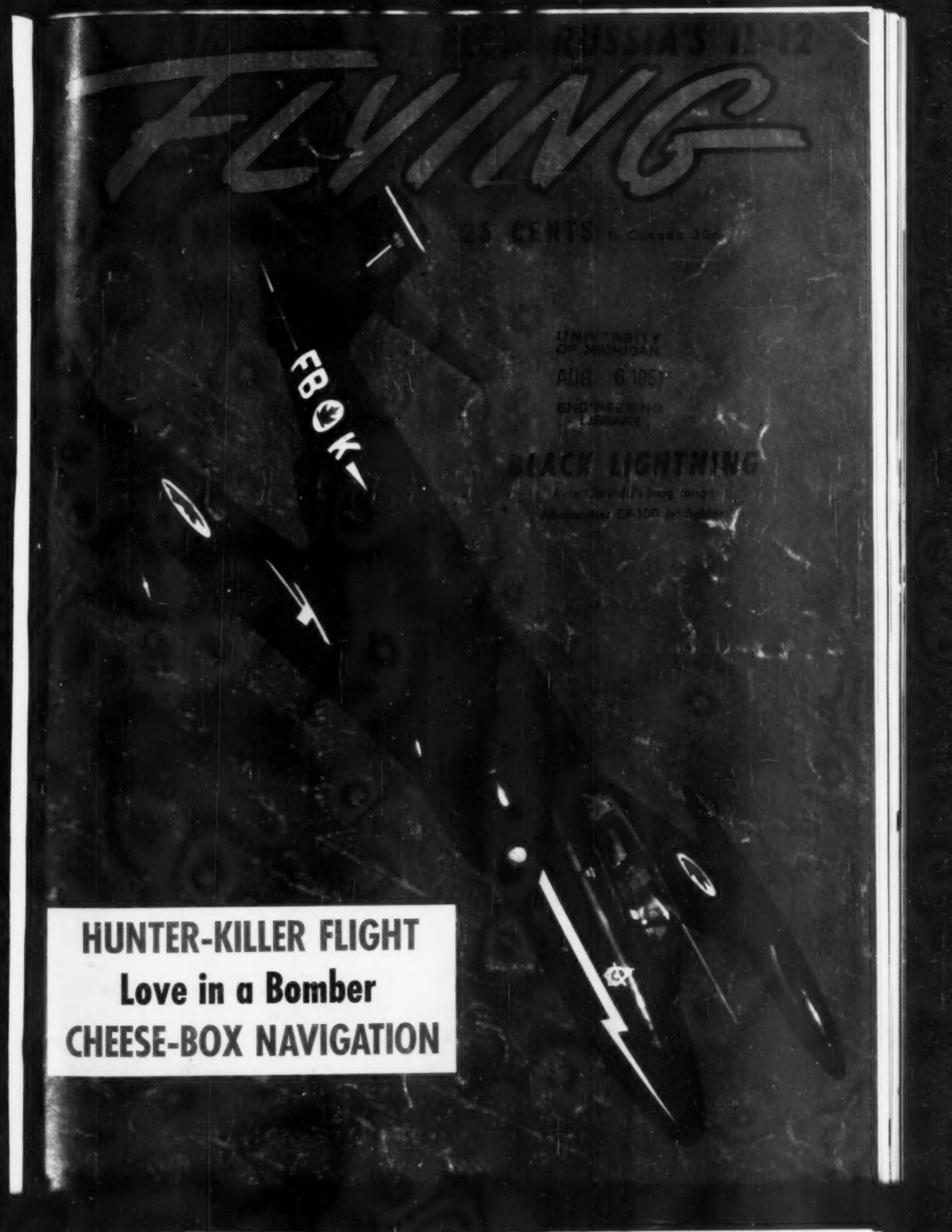
FLYING

25 CENTS (In Canada 30¢)

UNIVERSITY OF MICHIGAN
AUG 6 1957
ENGINEERING LIBRARY



BLACK LIGHTNING

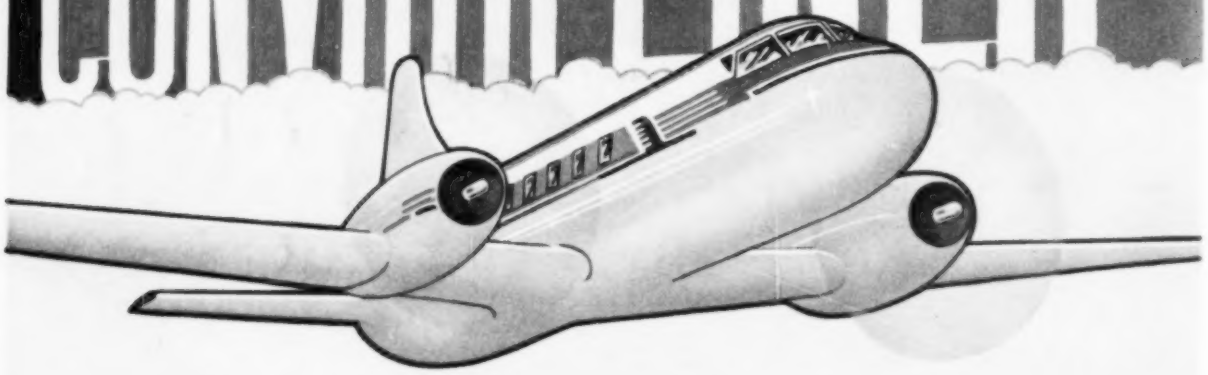
HUNTER-KILLER FLIGHT

Love in a Bomber

CHEESE-BOX NAVIGATION

UNIVERSITY OF MICHIGAN LIBRARIES

CONVAIR-LINER



The Choice of 20 Airlines

More Airlines Have Ordered
More Convair-Liners Than
Any Other Modern Transport!

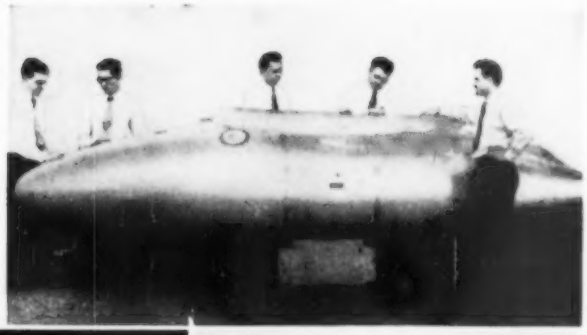
The T-29 — a military version of the Convair-Liner — is being ordered and operated in increasing numbers by the U. S. Air Force. And the Allison Convair-Turboliner, America's original turboprop transport, is still another "first" for the Convair-Liner design.

No air transport has ever equalled the Convair-Liner in safety, dependability and operational economy!

IN THE AIR -- IT'S CONVAIR*
*REG. U. S. PAT. OFF.

CONSOLIDATED VULTEE AIRCRAFT CORPORATION SAN DIEGO, CALIFORNIA FORT WORTH, TEXAS

SPARTAN GRADUATES ADVANCE FASTER....



THE RECORDS PROVE —

SPARTAN GRADUATES GET HIGHER STARTING RATES AND FASTER ADVANCEMENT...

While the cost of living has risen 100% the salaries of skilled aviation technicians have risen approximately 400%, within the same period of time. *This is definite proof that aviation offers greater possibilities for success to young men with ambition and sound training.*

The records of the SPARTAN Placement Department show that SPARTAN graduates receive higher starting salaries and faster advancement because they are immediately valuable to their employers. This department receives far more requests for SPARTAN graduates than are available. You can have your name on this "availability list," if you have studied diligently and have shown the necessary aptitude. You can be certain of immediate employment, upon graduation.

You must act quickly! Some important aeronautical firm wants to hire you as quickly as you can qualify. SPARTAN can help you as it has helped thousands of others. Write, NOW for complete information.

SPARTAN
A UNIVERSITY OF AVIATION
SCHOOL of AERONAUTICS — MAXWELL W. BALFOUR, DIRECTOR
COLLEGE of ENGINEERING — ADDRESS DEPT. F-91
TULSA, OKLAHOMA

The above SPARTAN graduates are part of a group a famous manufacturer of aircraft radio and instruments has employed at SPARTAN.

The SPARTAN graduates, top photo, are part of a group one of the oldest aircraft development companies — and foremost producer of military aircraft during World War II — has employed at SPARTAN.

SPARTAN is again training men for the United States Air Force. This is your assurance that there is none better than SPARTAN training.

GET THE FACTS . . .
LEARN HOW YOU CAN ACHIEVE SUCCESS

Maxwell W. Balfour, Director
Spartan School of Aeronautics Dept. F-91
Tulsa, Oklahoma

Please send your free Catalog immediately.

Name_____ Age____

Address_____

City_____ State____

Indicate which of these branches interests you.

☐ Flight ☐ Instruments
☐ Mechanics ☐ Aeronautical Engineering
☐ Radio ☐ Airline Maintenance Engineering
☐ Meteorology ☐ Flight Engineer

Spartan is approved for training under the G. I. Bill of Rights

UNIVERSITY OF MICHIGAN LIBRARIES

Chairman of the Board
WILLIAM B. ZIFF

President
B. G. DAVIS

Secretary-Treasurer
ARTHUR T. PULLEN

Vice-Presidents
MICHAEL H. FROELICH
Director, Eastern Division

H. J. MORGANROTH
Production Director

LYNN PHILLIPS, JR.
Advertising Director

H. G. STRONG
Circulation Director

Art Director
HERMAN R. BOLLIN

THE COVER. Improved version of the Avro CF 100 high-speed interceptor.

EDITORIAL

Publisher
WILLIAM B. ZIFF

Editor and Assistant Publisher
MICHAEL H. FROELICH

Managing Editor
FRANKLIN D. WALKER

Associate Editor
LOIS C. PHILMUS

Art Editor
JACK MARSHAD

ADVERTISING

Associate Advertising Director
M. J. CULLIGAN

Advertising Manager
DOUGLAS A. ANDREWS

Midwestern Advertising Representative
WILLARD C. MORREY

Western Advertising Manager
WILLIAM L. PINNEY

BRANCH OFFICES

CHICAGO (1)
185 N. Wabash
AN 3-5200

LOS ANGELES (14)
815 S. Hill St., TUcker 9213

FLYING

Reg. U. S. Pat. Off.

CONTENTS • SEPTEMBER, 1951

Time Is Running Out	John Giles	13
I Flew Russia's IL-12	Capt. E. M. Prchal	16
Black Lightning		18
Hunter-Killer Flight	Lieut. Comdr. George Cornelius	20
What Makes the Pilot Tick?		22
Love in a Wellington	Ruth Ballard	25
FLYING's Check Pilot: The Rawdon T-1	Ed. Hoadley	26
Airborne Philippine Missionary	Vivian Cannon	28
Flying in Paradise	Capt. Don Browne	30
Cheese-box Navigation	Alice S. Fuchs	32
Cabin Maintenance	Gilbert Close	34
Have You Seen?		35
I Learned About Flying From That! No. 141	Vincent J. Donahue	38

SHORT FEATURES

The Mail Box		7
Military News		10
AOPA News		40
Logging Time	Hy Sheridan	42
Civil Air Patrol Wing Talk		44
Notes on Civil Flying		46
Flying Farmers, U.S.A.	Bill Renshaw	51
Betty Skelton's Notebook		55
"And There I Was . . ."	Robert Fabrize	58
A FLYING Tip	L. E. Johnston	62
Flat Spins	Harold Helfer	63

PHOTO CREDITS 64

COPYRIGHT 1951
ZIFF-DAVIS PUBLISHING COMPANY
366 Madison Ave., New York 17, N. Y.
Member of the Audit Bureau of Circulations
VOLUME 49 • NUMBER 3

FLYING is published monthly by the Ziff-Davis Publishing Company at 366 Madison Ave., New York 17, N. Y. Copyright under International Copyright Convention. All Rights Reserved. Entered as second-class matter September 8, 1942, at the Post Office, Chicago, Ill., under the act of March 3, 1879. Entered as second-class matter at the Post Office Department, Ottawa, Canada.
SUBSCRIPTION RATES: In U. S., Canada, Mexico, South and Central America and U. S. Possessions, $3.00 for twelve issues; in British Empire, $4.00; all other foreign countries, $4.00 for twelve issues. Subscribers should allow at least two weeks for change of address. All communications about subscriptions should be addressed to the Director of Circulation, 185 N. Wabash Ave., Chicago 1, Ill.
CONTRIBUTIONS: Contributors are advised to retain a copy of the manuscripts and illustrations. Contributions must be accompanied by return postage and they will be handled with reasonable care, but this magazine assumes no responsibility for their safety. Any copy accepted is subject to whatever adaptations and revisions are necessary to meet the requirements of this publication. Payment covers all author's, contributor's and contestant's rights, title, and interest in and to the material accepted and will be made at our current rates upon acceptance. All photos and drawings will be considered as part of the material purchased.

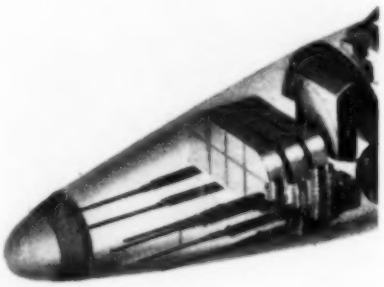
THE MAIL BOX

F-89 CANNON

In the May issue FLYING there is a section of USAF planes and on page 104 the Northrop F-89 is marked ". . . six 20-mm. cannon." I looked wherever I could and all I saw were four 20-mm. cannon. Which is correct?

A. SCIUKA

New Britain, Conn.



● FLYING *is right. The cutaway view shows the six 20-mm. cannon set up in the nose assembly.*—ED.

ENLIGHTENING MR. LIGHT

If the instructor who taught Leonard M. Light (The Mail Box, July) knew his business, Mr. Light wouldn't have to flounder around the sky until he stumbled upon the answer to his problem.

When I was a student (quite some time ago, I'm afraid), one of the things that was constantly drummed into my head was "Keep your hand on the throttle!" It is obvious that if you have to make a split-second decision to either "pour on more coal" or "cut the gun," you don't lose precious seconds trying to locate the darn throttle . . . and it can't creep back when you aren't looking.

It's a long way back to Floyd Bennett Field and the old Lincoln *Standard*, the *Fleet* and *Moth*—(I learned the hard way—in an open job in the winter) but I can still hear my instructor screaming (and so could everybody else on the field). . . . "Keep your hand on that—throttle!

LORETTA RAY

New York, N. Y.

DONALD DUCK & CO.

While touring Denmark recently, I visited a small airdrome outside Copenhagen and was immediately attracted by a cheerfully-painted (orange and yellow) lightplane with *Anders And & Co.*, lettered on the fuselage. But what really took my fancy were the breezy-looking characters painted on the fuselage. Biggest portrait was our old favorite Donald Duck (*Anders And* is the Danish name for Donald Duck). I identified the five other characters as Mickey Mouse, the Wolf, Pluto, Goofy, and one of the Three-Little-Pigs.

By this time my curiosity was completely aroused and I learned that the plane (a Danish KZ-VII four-seater) is owned by Gutenberghus of Copenhagen, a large Danish publishing and publicity firm that puts out a Walt Disney children's magazine.

A baby motor-scooter (also painted yellow and orange) is stowed in the rear of the cabin for convenient airport-to-town transportation.

Gutenberghus certainly knows the value of publicity. The plane and scooter never fail to draw a crowd . . .

CHARLES W. CAIN

London, England

TIP TO A TIPSTER

Here's a tip on a tip to a tipster. Having instructed Air Force cadets at the "West Point of the Air" and now instructing Air Force instructor pilots, we feel qualified to correct both lieutenants Kernell and Freeman who wrote tips on the mnemonic check list in recent issues of FLYING.

First, the use of a mnemonic check list is no longer authorized by the Air Force, as it is limited to the individual aircraft—that is, to the T-6.

Second, the previously used CIGFT-PRSS should be corrected to read: C—controls, I—instruments, G—gas, F—flaps, T—trim, P—prop, R—run-up, S—shutters (oil and carburetor head), and S—shoulder straps. The tail wheel is then checked locked prior to taking the runway.

"It's taught like that in the Air Force these days."

LIEUT. K. P. MILES
LIEUT. W. H. GINN, JR.
LIEUT. P. R. HOWELL

Selma, Ala.

IT'S AN ILL WIND

I have a friend who says a flight from point X to point Y and return can be made as fast on a windy day as on a calm day. I say it will take longer on a windy day but I can't make him see it. Can you give me a simple example to prove my point?

T/SGT. OLIVER C. CARLISLE

Bossier City, La.

● *The simple example: Assume you are flying from point X to point Y and return—a distance of 100 miles each way. Assume your plane cruises at 100 m.p.h. Let's forget time consumed in take-off and so on, assume that under no wind conditions it will take you just two hours.*

Now, let's say that you make the same flight with a 20 m.p.h. headwind, which on your return trip will become a 25 m.p.h. tailwind. Your ground speed with the headwind will be only 75 m.p.h. Since you are to go 100 miles, it will take you 1 hr. 20 min. to fly from X to Y.

On your return flight, your ground speed will be 125 m.p.h.—or eight-tenths of an hour, or 48 minutes to fly from Y to X. Thus, your total flight time with a 25 m.p.h. headwind and with a 25 m.p.h. tailwind amounts to 2 hr. 8 min.

A headwind always impedes a plane more than a tailwind helps it. The critical point is that more time is lost when flying against a headwind than is gained by flying with a tailwind—ED.

HOW TO STOP CRASHES?

Many future crashes might be avoided if (1) proper markings were placed at the beginning of the *serviceable runway* when parts of the runway are under construction, (2) ditches at end of runways were filled in so that level ground would extend for some distance beyond the runway end, (3) mechanical barriers like those used on carriers were installed beyond the ends of runways, (4) emergency parachute-stop devices were installed on airliners.

WES RICKETTS

Philadelphia, Pa.

FLYING'S IN THE "DOGPATCH"

I was just reading your article on the Far East Air Force "A Day in Combat" [May FLYING] at "Dogpatch," Korea, which you say is the air base of the F-80 jets of the 51st Fighter Bomber group.

The 51st Fighter Group is not stationed at "Dogpatch." It's the 18th Fighter-Bomber Wing and we have had the name "Dogpatch" ever since we have been here in September, 1950.

Al Capp, Lil Abner creator, is an honorary member of the 18th FBW and he has designed us a wing insignia for our base.

CPL. WAYNE D. FETHER

APO/San Francisco, Calif.

● *Sorry.*—ED.

WORLD CHAMPION?

You will be interested to know that I am recognized as the World Champion at recognizing aircraft from pictures by the Royal Canadian Flying Clubs Association, representative in Canada for the Federation Aeronautique Internationale.

My official score is 1,015.

RENE CHARETTE

Ottawa, Ontario, Canada

(*Continued on page 41*)

MEN OF THE HOUR

Embry-Riddle

are moving UP!

Thousands of Embry-Riddle trained engineers, mechanics, specialists and pilots are making rapid strides in today's booming aviation industry. You can join them, *now!*

Men in the top jobs now, who are moving up...up...up...are undeniably proving that thorough, practical Embry-Riddle training is by far your quickest, surest road to success in aviation. Complete eight-month to two-year Embry-Riddle courses in every phase of aeronautics are tailored to the practical and exacting aviation industry requirements. Your Embry-Riddle graduation certificate insures your career opportunity.

The latest, most modern equipment (including jet engines), the finest instructors, the most complete aviation school campus anywhere, are all yours at Embry-Riddle. You learn fast and well, working with live aircraft in vast shops and hangars.

If military service interrupts your studies, you're still a long way ahead of the crowd. During World War II, more than 30,000 pilots, technician and mechanics of the air forces were Embry-Riddle trained!

If you are now a high school student, a graduate or a veteran, investigate at once the full advantages and tremendous career security of Embry-Riddle training. Join the Embry-Riddle Men of the Hour. Write for full information today.

4 Keys to Success!

1 AIRCRAFT & ENGINE MECHANICS

Vast numbers of *properly trained* A&E Mechanics are urgently needed. Our C.A.A.-approved school with a quarter-century experience assures your quickest advancement. Embry-Riddle students learn fast with modern equipment, including jet . . . live aircraft, airline-size hangars.

2 A&E COMBINED WITH COMMERCIAL

Airmen with *dual* pilot-engineering ability are needed by aviation companies and operators. Embry-Riddle *combination* training offers you the most in your aviation career.

3 AERONAUTICAL DESIGN AND TECHNOLOGY

Embry-Riddle's accelerated 26-mo. Aeronautical Design and Technology Course provides finest training available. Technicians with management responsibility enjoy highest salaries!

4 COMMERCIAL PILOT

Embry-Riddle trained pilots benefit from our years of experience with 30,000 students... the best instructors, up-to-date aircraft, superb year-'round flying weather. Also Instrument and Instructor's ratings.

CLASSES BEGINNING NOW -- SEND COUPON TODAY!

Dean of Enrollments -- Dept 94
Embry-Riddle School of Aviation
MIAMI 30, FLORIDA
Please Print

NAME _____

ADDRESS _____

City _____

State _____ Age _____

I am interested in...

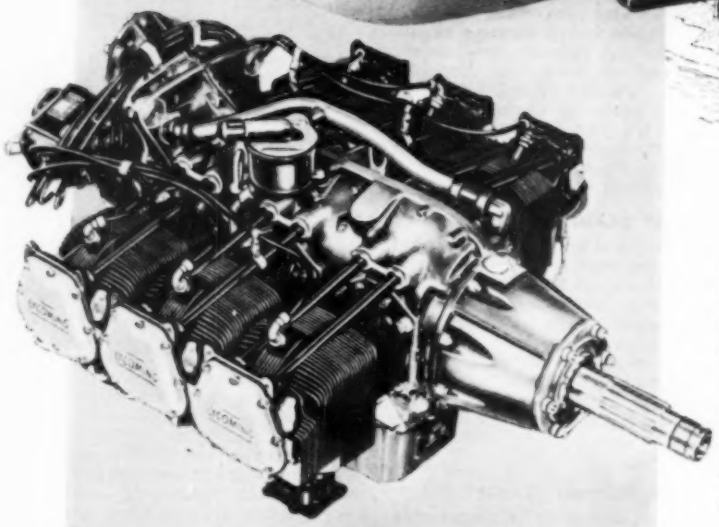
- ☐ A.&E. Mechanic
- ☐ Commercial Pilot
- ☐ Aeronautical Design and Technology
- ☐ A.&E. Combined with Commercial Pilot
- ☐ Flying Mechanic

Check One ☐ Veteran ☐ Non-Veteran

Embry-Riddle
International
SCHOOL OF AVIATION
MIAMI 30, FLORIDA

TRAIN IN MIAMI -- AIR CAPITAL OF THE WORLD

UNIVERSITY OF MICHIGAN LIBRARIES



LYCOMING'S DEPENDABLE POWER

puts extra safety

in the

AERO COMMANDER!

AS A CLEAR DEMONSTRATION of the extra safety offered by the new Aero Commander, a standard model recently flew non-stop from Oklahoma City to Washington, D. C. *with one propeller removed.* Over and above such proven dependability, this luxurious executive type plane also offers smooth, quiet operation and high performance. It can easily be adapted for cargo or rescue service; equipped for land, snow, or water.

A MULTITUDE OF RIGOROUS FLIGHT TESTS have proven the extra dependability of Lycoming engines under the toughest operating conditions. The twin Lycoming GO-435-C2 engines in the Aero Commander are equipped with gear reduction—the same as that used in big commercial planes. The result is greater engine and propeller efficiency, making possible longer, more comfortable flights at lower cost. You can be sure of your plane when it's . . .

POWERED

BY LYCOMING

LYCOMING-SPENCER

DIVISION

AVCO

WILLIAMSPORT • PENNSYLVANIA

AIRCRAFT ENGINES AND RELATED PRODUCTS • AIR-COOLED INDUSTRIAL ENGINES AND RELATED PRODUCTS
PRECISION MACHINE PARTS • RESIDENTIAL AND COMMERCIAL BOILERS • STEEL PLATE FABRICATION • GRAY IRON CASTINGS

MILITARY NEWS

EVACUATION AID

An improved, all-purpose sheet aluminum litter platform has been developed by the Bell Aircraft Corporation for evacuating wounded troops by helicopter. The key feature of the device is

a plexiglass cowl which acts as a windshield to protect the head and shoulders of a casualty. It provides excellent weather protection without interfering with ventilation or visibility. A cover of chlorophene-coated nylon fabric protects the lower parts of the body. Heater ducts, controllable by the pilot, are incorporated within the cover which has a "pressurized-seal" zipper for closing.

9½ TONS PARACHUTED

In recent tests at Wright Field, a giant nine and one-half ton bulldozer was successfully parachuted from a USAF Fairchild C-119. To absorb landing shock, the bulldozer was separated from the platform by crash frames—a series of shelf-like layers which crumple consecutively.

NEW TESTING CENTERS

To insure higher flight ceilings for Navy fighters, the Navy's Bureau of Yards and Docks is completing an aeronautical turbine laboratory at Trenton, N. J. Incorporating design techniques by York Corporation, the turbine lab will consist of five testing chambers composed of two altitude "strato-chambers," two test cells and one turboprop cell.

The world's largest liquid rheostats, to help test full size jet engines, guided missiles, wing sections and fuselages are to be built in the Buffalo plant of Westinghouse.

JET STARTING METHOD

Starting jet engines by "artificial respiration" has been described by General Electric as "an apparently practical means of starting jet aircraft at advance bases where external power units are unavailable, or in extremely cold weather where effectiveness of such starting sources is reduced." When the engine of the lead plane is accelerated to full power, the exhaust blast is sufficient to wind-mill the power-plant of the "disabled" aircraft to more than initial firing speed and a normal start is made.

F-84's CAN TAKE IT

The Korean war proved the value of the jets. Despite heavy damage to the tail pipes, turbine sections, combustion chambers and oil lines, the Republic Thunderjets, powered by the Allison J-35 axial flow turbo-jet engine, have all returned to the base safely. In many instances field replacement of damaged parts had permitted return to operation within a very few hours.

ROBOT BRAIN FOR TESTS

The "mechanical brain," a new digital differential analyzer, will become a part of a flying laboratory that North American Aviation is preparing for in-flight testing of guided missile components. Guidance equipment, such as automatic control and navigation units, can be interconnected with the "brain" which will then do a lot of the "heavy thinking" for scientists in rapidly figuring out the proficiency of such equipment in mathematical terms.

NEW TURBINE STARTER

Airesearch 140-h.p. air turbine starter, powerful enough to start turbojet and turboprop engines in the 10,000 pound thrust and the 8,000 h.p. class within 10 to 30 seconds has successfully completed final cycling tests required by the Air Force. One of the most powerful air starters ever developed, the unit weighs but 32 pounds and is not much larger than an ordinary one-horse-power automobile starter.

RADAR ENCLOSURE

Manufactured for the Air Force by Firestone to protect radar installations from the elements, this giant radome of

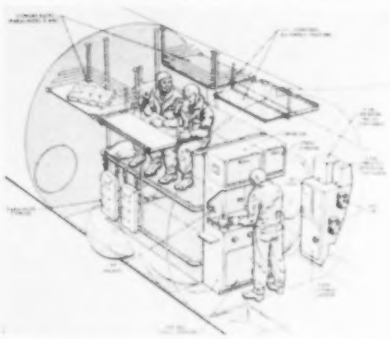
rubberized fabric has a volume of 57,000 cubic feet and packs into a 95 cubic foot canvas bag when deflated for shipment in the wooden box pictured beside it. The structure measures 167 feet in circumference and 36 feet in height.

BLIMP PROPELLER

Two of the new Curtiss-Wright propellers, the "Zep-prop," have been installed by the Navy in the Goodyear ZPN, said to be the world's largest blimp. Equipped with a special "transmission," which enables Navy blimps to back-up in flight and to hover in a stationary position, the Zep-prop adds ease and precision of control to the long-range, sustained-flight advantages of lighter-than-air craft for anti-submarine defense. Each propeller consists of three hollow-steel blades swung in an 18-foot arc. Usually, both engines are in simultaneous use, but either can drive both propellers when desirable during low-speed operations or to conserve fuel on long patrols.

STRATO MADE LIVEABLE

A good-sized completely-equipped galley in the aft compartment of the B-36 has been devised by Convair engineers



and Air Force personnel to cut down crew fatigue on long missions. The B-36 crew will soon be eating hot meals, prepared and served in the stratosphere. Crew members in the forward cabin will receive their food in an insulated conveyor which travels through an 85-foot communications tunnel. Lightweight retractable tables and folding chairs allow crew members to eat in comparative style and comfort. Sleeping, sanitary and storage facilities have also been improved, as part of the "combat crew effectiveness" project.

BRITISH DEVELOPMENTS

A British jet aircraft is now flying with special engine turbine blades which transmit radio signals to the ground by giving a "running commentary" on the strains and stresses set up on the blades. British engine experts believe that their research on this jet will help them to make important improvements in the design of the blades which are the most critical part of the jet engines.

The latest types of British Air Force and Navy jet fighters are being fitted with an emergency compass in the event that the distant reading gyro goes out of action. It is about the size of a golf-ball and weighs only three ounces. Called the E2A, it has been developed by the Admiralty Compass Observatory.

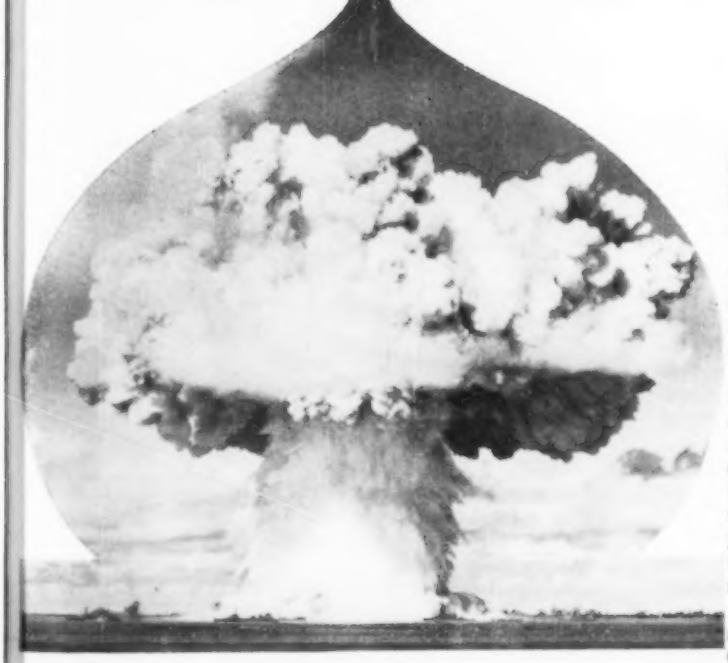
PRECISION FLYING AID

Tight formation flying of Lockheed F-94 jet fighters has been greatly simplified through use of the Sperry Zero Reader flight instruments by USAF pilots. The Zero Reader tells the pilots how to move their controls to stay on a selected flight path. In close-knit flight array the pilots reach cruising altitude and then set up their course on the heading-selector unit of the flight instrument.

UNIVERSITY OF MICHIGAN LIBRARIES

Prototype of Russia's atom-bomb carrying fleet of long-range jet aircraft is this Ilyushin 16, development of Heinkel 343. It is fast, efficient.

TIME *is Running Out*



Top-level production planners pin-point the major problem the aircraft industry faces in the race against time to rebuild the U. S. Air Force

By JOHN GILES

CAN WE REBUILD our aircraft industry fast enough to meet production schedules the military planners have projected for 1952 and 1953?

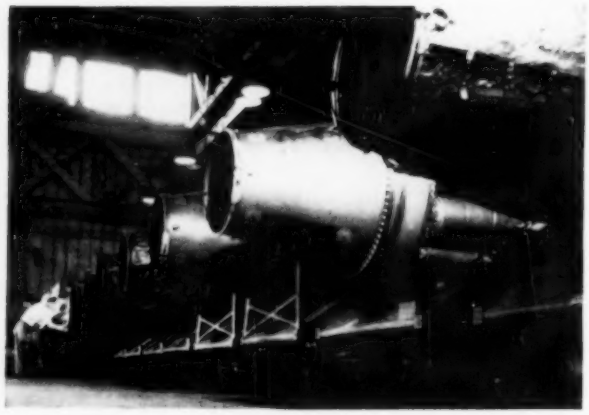
It is common knowledge that our present Air Force, despite its excellent striking power, is inadequate in quantity and quality to meet the exacting requirements of a major war of the type anticipated.

Not so widely accepted, however, is the cold fact that the Air Force will continue to be inadequate for some time to come, perhaps beyond the '52 and '53 deadlines, unless the task of increasing the industry's capacity to produce continues without serious interruption. Anything that impedes that build up now or in the months just ahead will interfere with the production of the right types and numbers of planes needed next year and in 1953.

This need for the right numbers and types of airplanes applies particularly to the Strategic Air Command, which has the broad mission of destroying the enemy's war-making potential.

In a new war, we can expect that an alert enemy will immediately undertake a paralyzing attack upon American resources—by manned planes or guided missiles or both. It is apparent then that the Strategic Air Command will have a greatly enlarged function. Destruction of bases the enemy will use for his planes and missiles becomes a vital necessity.

This suggests that SAC might be split in order to permit a fourth combat establishment in the Air Force—beyond the present Strategic, Tactical and Interceptor elements. This fourth element would be a separate command charged with the exclusive task of destroying the bases from which the enemy would strike against America.



Jet engines are more complicated, require more time to develop and produce than aircraft piston engines.

There is no question that SAC is the major deterrent to the Russians and, at the outset of war, would be the most active of all US weapons. It would carry the fight to the enemy in every way possible.

But many Americans have greatly exaggerated confidence in our present long-range bombing capabilities. Much of it springs from the claims made for the B-36 two years ago when the big strategic bomber, with its atomic bomb carrying power and its excellent range, was the center of the ill-timed Air Force-Navy controversy.

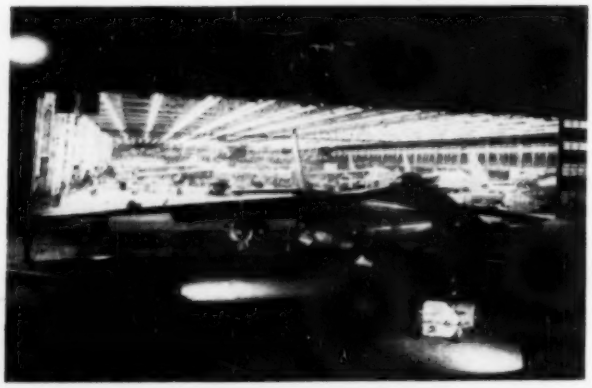
The big bomber is still the best of its type, but it is time for public recognition of this important point:

The present B-36 is already obsolescent. A new and radically modified B-36, a swept-wing 8-jet model, and the 8-jet B-52 will both have greater speed. Neither of these is anywhere near production, but the Air Force will have 6-jet Boeing B-47 bombers in strength by January of 1951. The B-47 is not, however, an intercontinental bomber.

The number of airplanes assigned to SAC—somewhere around 2,200—was set up sometime ago. As of a year back, the assignment was correct. But since then the USSR, which at the time of this writing has fewer than 1,000 strategic aircraft, has suddenly gone in for long-range, intercontinental bombers capable of carrying atomic bombs.

It is time for another look at the SAC plan, because of (1) our greater atomic capability, (2) the fact that our atomic stockpile will continue to grow larger, and (3) the threat of a Soviet atomic attack is more serious than ever before.

The Air Force has plans for 110, 125, 150 and 175 wing



Production of jet bombers like these B-47s is slow without smooth flow of materials into the plants.

build-up schedules, with most attention centering on the 150-wing plan, which is calculated to cost a staggering $30 billions annually. The entire cost of World War II military aircraft production was $44.8 billions.

In view of this situation, we set out to find the answer to the question: "Are we rebuilding our aircraft industry fast enough to meet production schedules projected for 1952 and 1953?"

Undersecretary of the Air Force John McCone, declared in an interview, that the aviation industry "can and does stand ready to give us twice as many or, indeed, even more aircraft should we call upon them to do so." Industry representatives in Washington stress that point.

Defense Mobilizer Charles E. Wilson reported on July 1 that "aircraft deliveries are currently about two-thirds higher than a year ago," but such statements are misleading. What Mr. Wilson might have said was that 355 military planes were turned out in June—a year after the start of the Korean war. In June, 1950, the Aircraft Industries Association reported 215 planes were produced, and that figure is the only one available on which to base accurate estimates.

Wilson said that present schedules call for tripling the

Armament is another item which must be developed simultaneously with plane. Shown here are rockets.

current rate of deliveries in the next 12 months. In other words, a total of 1,065 aircraft. This compares with President Truman's call for a five-fold increase by next December—1,275 planes.

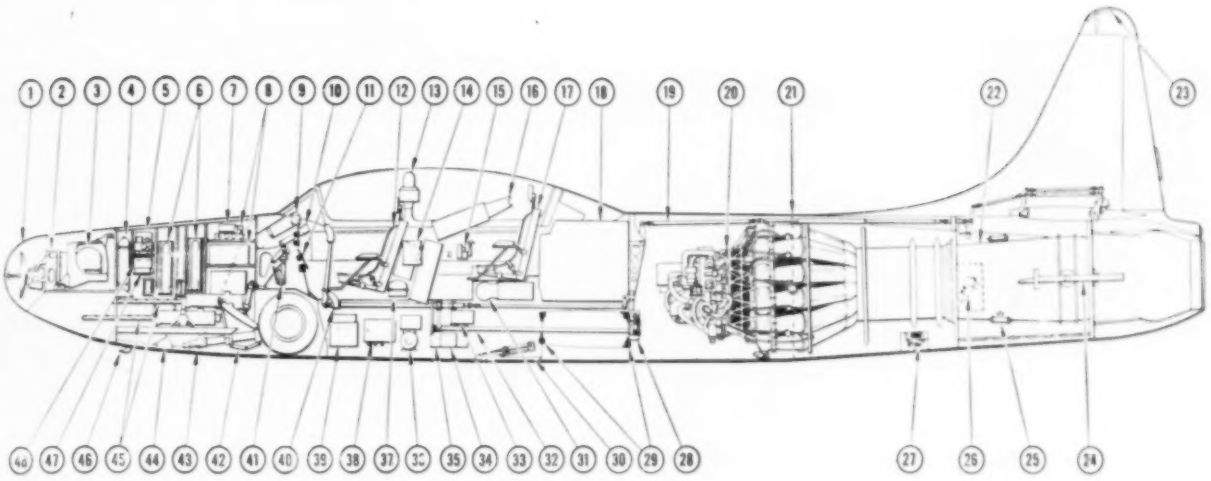
The April deliveries of military aircraft were no higher than in April, 1950, but there has been a steady increase since then and the payments to the industry have begun to double those of the previous year.

Deputy Secretary of Defense Robert A. Lovett says that deliveries have been coming in "at a regularly increasing rate, which approximates 13 per cent a month.

"Of aircraft deliveries, the monthly delivery rate is approximately 90 per cent of the schedules," he said. "The performance is, by and large, good. There are, however, spotty areas in it."

The No. 2 defense official went on to explain that funds for the expansion of aircraft procurement were not voted until last January 6.

"And it was that program which enabled us to back into and multiply the sources of production, increase facilities, and increase the lines," he said. "Because of the long lead time, we don't begin to get the full benefit of that capital expenditure for a period of months," he added. [ED. NOTE: Lead time is that period necessary between



From standpoint of design and manufacture, today's fast jet planes pose thousands of problems never before encountered. At left is shown a list of equipment needed in every Lockheed F-94 fighter. If one gadget is missing, the plane does not fly. This problem is multiplied a thousand-fold for jet bombers. An even flow of materials to equipment manufacturers is as essential as for airframe manufacturers.

1. Plastic Nose
2. Radar Antenna
3. Radar Modulator
4. Oxygen Bottle
5. Radar Range Servo Gear Box
6. Ammunition Boxes (4)
7. Position Light Flasher
8. Radio Receivers
9. Gun-Sight
10. Pilot's Radar
11. Instrument Panel
12. Pilot's Seat
13. Radio Compass Loop Antenna
14. Radar-Indicator Power Supply
15. Radar-Manual Contro
16. Operator's Radar
17. Radar Operator's Seat
18. Fuselage Fuel Tank
19. Elevator Control Rod
20. Jet Engine
21. Fuselage Aft-Section
22. Afterburner
23. Radio Antenna
24. Afterburner Track
25. Afterburner Eyelid Actuator
26. Elevator Tab Motor
27. Gyrosyn Compass Flux Valve
28. Aileron Booster Unit
29. Wing Beams
30. Dive Flaps
31. Turbine and Cooler Unit
32. Aileron Torque Tube
33. Cabin Air Mixing Valve
34. Interphone Amplifier
35. D-2 Inverter
36. Radar-Inverter
37. Radar-Vertical Gyro
38. Censored Radar
39. Batteries
40. Aileron-Elevator Control Assembly
41. Rudder Pedals
42. Nose Alighting Gear
43. Fuselage Nose-Section
44. Case Ejection Door
45. Machine Guns (4)
46. Air-Speed Pitot
47. Gun-Sight Computer
48. Gun-Sight Amplifier Servo

receipt of material by the manufacturer and the delivery of the finished airplane.]

Lovett said that the lead time even on a fighter aircraft is now 18 months because of the long lead time needed in the manufacture of such items as jet engines and electronics equipment which must go into the plane.

He said the industry is expected to run into some increasing material shortages, except as the position is improved by the introduction of the Controlled Materials Plan. He declared that the CMP is the real method of shortening lead time. Lead time is not shortened by dollars, he said. It takes materials in the hands of the fabricator of the end product—the airplane.

How soon does he expect deliveries to hit 100 per cent of schedules? Mr. Lovett appeared somewhat hesitant. He figured that it is a matter of judgment—that some months deliveries would run 100 per cent, and some months under that. Deliveries will never hit 100 per cent and just remain there, he added, but this fall there should be what he described as "more reliable aircraft production."

Mr. McCone, calling for creation of "American airpower second to none," said that he is convinced that the "production of air power in sufficient quantity to make the United States supreme in the air can be achieved a good deal faster than is popularly supposed."

Any substantial and accelerated increase poses very difficult and practical problems, he said. "They are today the same as always, beginning with the key problem of aircraft production and extending through the whole field of related problems," said Mr. McCone, whose principal responsibility is production. "But the heart of the expansion problem today, as it was in World War II, is aircraft production and all other programs must be geared or phased-in with it," he said.

He had this to say about lead time:

"What is not commonly known is that the greater part of this lead time is consumed not in the actual fabrication of the aircraft or its components but in the tedious process of assembling necessary materials. Here the difficulty arises in the intense competition between the civilian economy and military demand, and beyond that within the military itself, for (*Continued on page* 42)

I Flew R

How good is Russia's best commercial transport? "It has more bugs and badly assembled details than any other plane I've ever flown," says the author in this first pilot report on the IL-12.

By CAPT. E. M. PRCHAL

THE IRON CURTAIN is a soundproof barrier through which little information on Soviet plane activities escapes. But before flying over the Iron Curtain [see "Escape Flight From Prague," June FLYING], I flew behind it, and I would like to make a first-hand report on Russia's most highly-touted transport—the Ilyushin IL-12.

I have flown this twin-engined aircraft about 800 hours and so my story is not hearsay. But it is important that it be told, because I recently read in the British magazine *Flight* that Soviet agents are making a strong effort to sell the IL-12 to South American countries in competition with U.S. airplanes. The price quoted is $125,000 flyaway Prague—only a fraction of the price of the *Convairliner* or the Martin 404 with which the IL-12 apparently would compete. Well, there is a reason for its low cost.

With its pickled golden surface, not bright aluminum as are U.S. airliners, the IL-12 apparently is an airplane

Russia's IL-12

Captain Prchal

of aerodynamic beauty and elegance. And yet it has more bugs and badly assembled details than any other plane I have ever flown, and I have flown more than 130 different types. According to *Flight*, "European pilots who have flown the machine [IL-12] are said to think highly of it." It must be kept in mind that a pilot flying the aircraft from countries behind the Iron Curtain cannot give the true answer if he wants to return to his home base.

There are today about 18 IL-12's in the satellite countries and their experience has not been very happy. Czechoslovak Airlines (CSA) has 10, Polish PLL three, Russian-Romanian TARS five. None of these countries has bought the IL-12 voluntarily.

The IL-12 was first demonstrated to us on Czechoslovak Airlines at Prague Airport Ruzyne in the spring of 1949. The demonstrator crashed in the High Tatra Mountains on the Czechoslovak border on its return flight to Moscow but the news was kept secret. Shortly afterward CSA received its first two IL-12's. Later, additional planes were delivered to bring the number to 10.

Polish PLL received three at about the same time. The first crashed on the field about 200 yards from Shonnenfeld civilian airport in the Russian Zone of Berlin. No official report was issued but I saw the crashed plane from the air shortly after the accident. Presumably the port engine caught fire during the flight because the left wing was completely burned off. Aircraft No. 2 crashed somewhere in Poland. Again no report was issued. Polish PLL received two replacements for these wrecked aircraft.

Russian-Romanian TARS received five IL-12's and one of them crash-landed on Vitosha Hill about five miles from Sofia. No reason for the crash was ever given.

The Russians themselves started to use IL-12's on the Moscow-Lwow-Prague line in the summer of 1949 but in the winter they switched back to the old Li-2's (licensed DC-3's). They did the same again this past autumn.

The IL-12 is a tricycle-geared airplane which was originally designed with conventional gear. That necessitated moving back the wings and center section in order to obtain a new center of gravity.

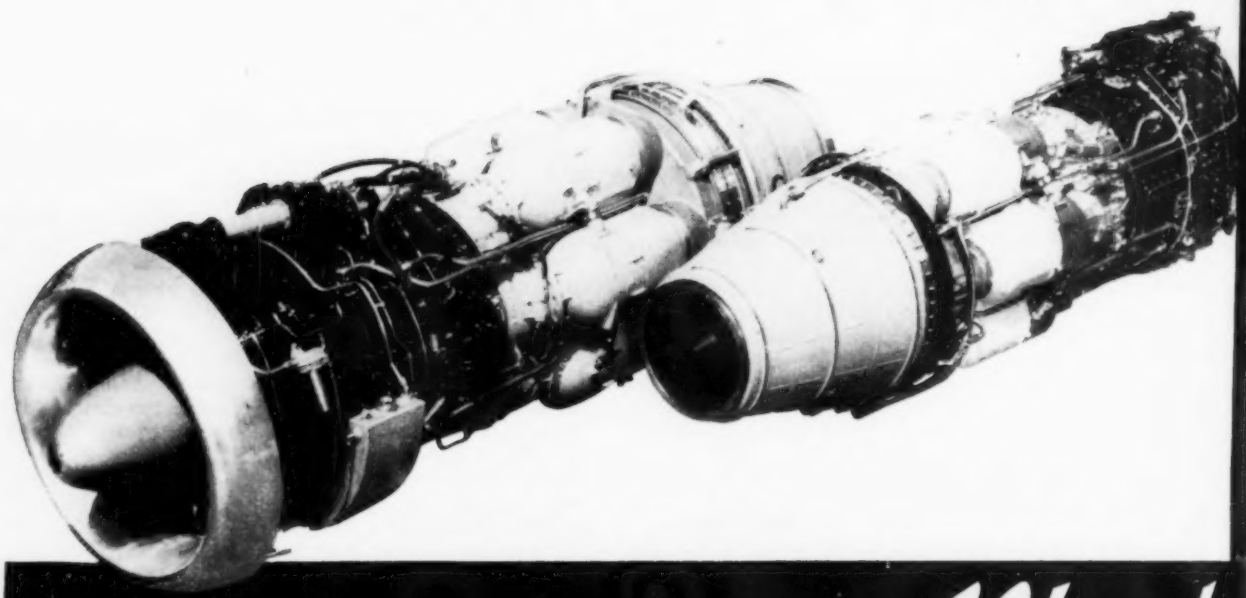
This was done without any reconstruction of the fuselage, as an expert would notice immediately. The fuselage itself is too short to make the plane directionally stable.

The cabin is not pressurized. Wing de-icing equipment for which the exhaust gas is used has one very serious shortcoming—it is not interconnected and in case of engine failure under icing conditions you have had it, because you can't de-ice that wing. De-icing equipment for the tail unit is electrically operated but the system is so complicated that it is unserviceable in 90 per cent of the airplanes.

During flight under severe icing conditions and with the tailplane iced up, a pilot has no choice—he must get down below the freezing level as rapidly as possible. No pilot has enough strength in his legs to keep the plane in straight and level flight under (*Continued on page* 53)

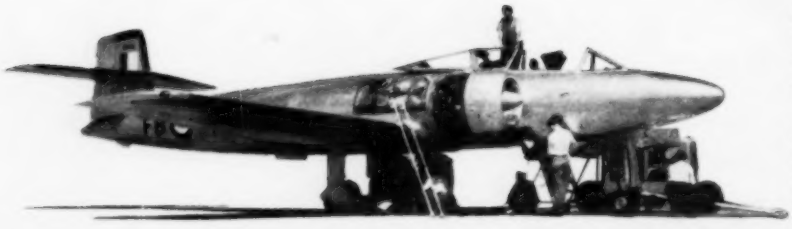
IL-12 radial engines are 14-cylinder 1,850 h.p. Maximum speed is 252 m.p.h. at a ceiling of 8,250 feet.

With the CF-100, Canada takes its place in the forefront of world engine and aircraft makers.



Avro Canada's new Orenda jet engine, left above, beside its immediate predecessor, the Chinook. The Orenda has just been installed in the CF-100 fighter shown below.

Black L

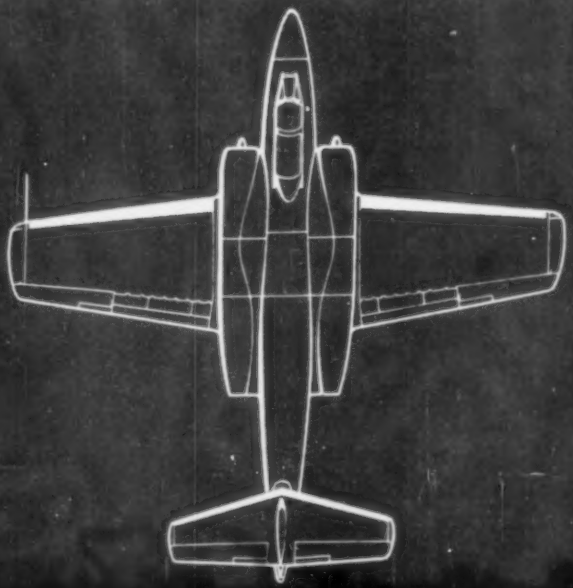


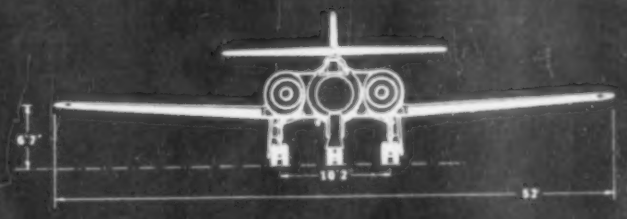
IT IS SIGNIFICANT that the first all-Canadian aircraft of the post-war period should be an all-weather jet fighter with exceptional long range, fire power, maneuverability and rate of climb—plus transonic speed.

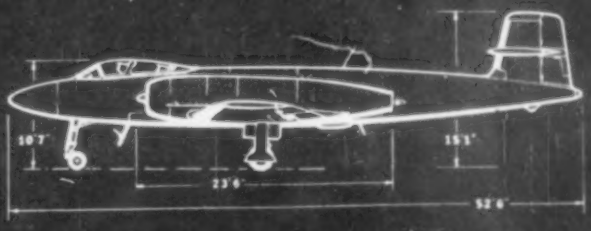
The plane is, of course, Avro Canada's twin-jet CF-100, a big black fighter that is shaping up as one of the most versatile combat planes developed since World War II.

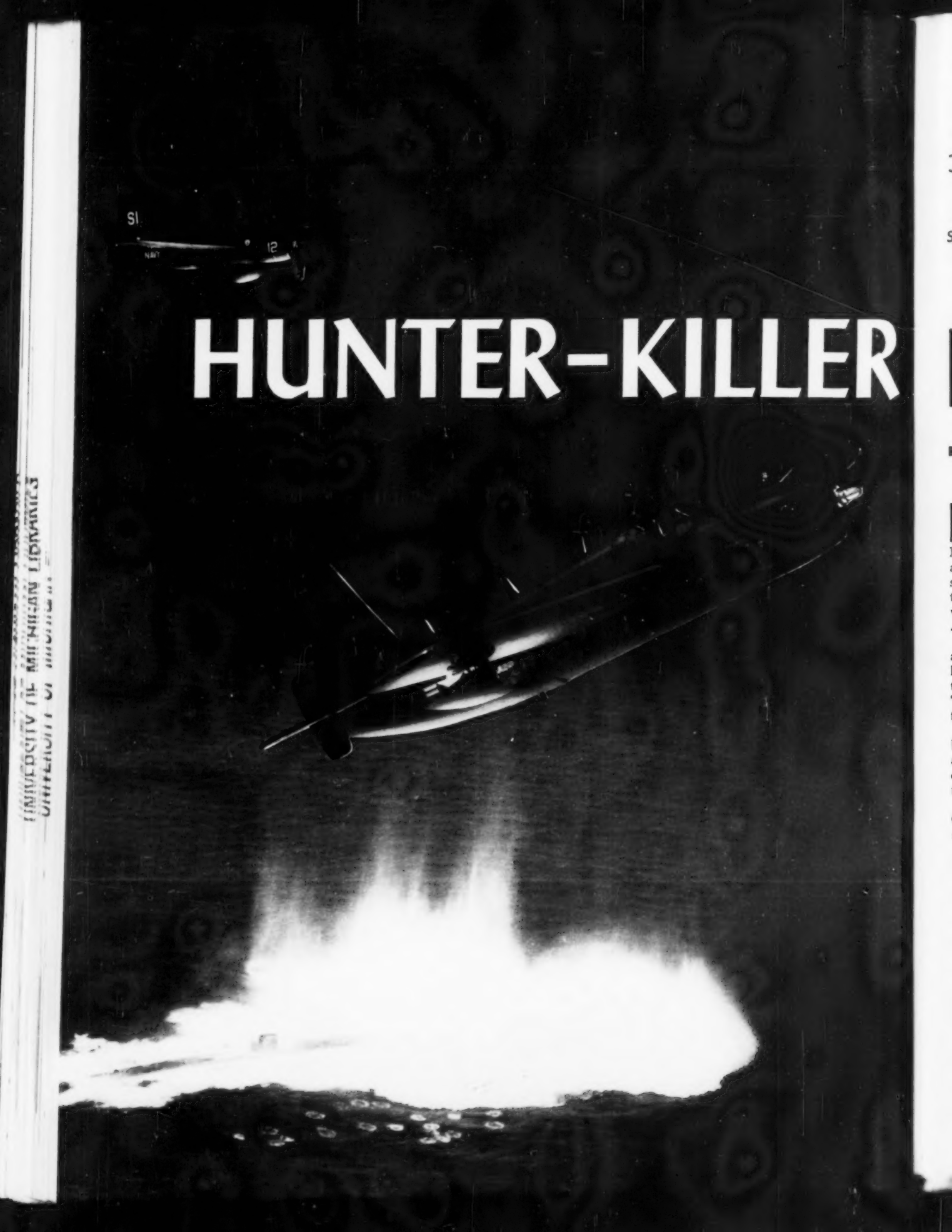
With the military air requirements of the North Atlantic Treaty Organization in mind, Avro planned the CF-100 for duty on the strategic far northern air routes over the top of the world. Its primary job, working closely with the radar defense network now being pre- (*Continued on page* 59)

k Lightning







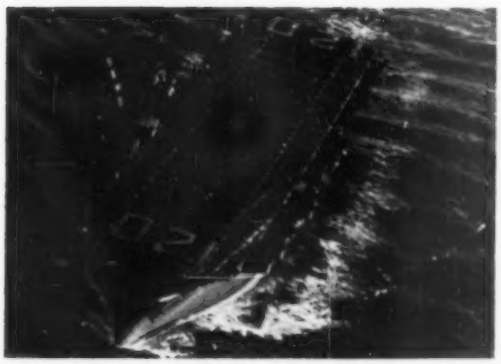


UNIVERSITY OF MICHIGAN LIBRARIES

The mission of hunter-killer teams is to destroy enemy subs. Here's how it's done.

FLIGHT

By Lieut. Comdr. George Cornelius, USN



This is the CVE carrier, labeled "SNARL" for code purposes, from which the author operated during maneuvers.

A plane from escort carrier surveys the scene of victory, circling over spot where "enemy" sub was blasted.

I AM A KILLER—deadly half of the antisubmarine warfare hunter-killer team. But at 0100, sitting in my plane on the port catapult of an escort carrier in the North Atlantic, I don't feel like a killer. My aircrewman and I are about to be kicked off into the night to hunt submarines for three hours, and I am thinking that if I'd taken that design engineering job last fall, I'd be home with my family now instead of out here on a November ASW exercise.

Across the flight deck from me on the starboard cat is a radar-pregnant "Guppy", hunter half of the hunter-killer team. Its engine sets up an ear-tingling clamor as the catapult officer spins his green lighted plastic wand. The wand drops, and eight tons of airplane hurtle off the flight deck.

Now it's my turn. I burrow back into headrest and seat, bracing for the cat shot. I shove the throttle full forward and the plane quivers. I flick my lights up, the wand goes down again, and the catapult is fired. Acceleration slams me farther back in the seat, then fades into flying speed.

I climb to a thousand feet on instruments to find the Guppy. As I slide into position on his starboard wing, he sees me and calls the ship on VHF:

"SNARL, this is 408 SNARL. 411 joined up. Request Robin."

The ship replies, "408 SNARL, this is SNARL. Your signal Robin."

408 is the Guppy's side number, 411 my own. SNARL is the ship's call. We identify ourselves by our numbers and that call.

We are out on large-scale cold weather maneuvers involving three separate forces.

To the east is the Main Force, a Marine amphibious landing team protected by cruisers, destroyers, and large carriers. Its objective is a rocky Newfoundland beach. We don't know it now, but these same Marines will soon be landing on other rocky beaches—in Korea. South of the Main Force steams its Supply Train of cargo ships and tankers.

"Enemy" submarines will attempt to intercept the first two forces. Our CVE and its destroyers comprise the third force. Assisted by land-based aircraft and blimps, we must "eliminate" the subs.

My aircrewman, Aviation Chief Ordnanceman Bill Barker, asks on intercom, "Permission to turn on the radar, sir?"

I respond, "Permission granted."

The first leg of our search begins. The night is like the bottom of a tar barrel. To ward off instrument vertigo, I keep my head moving.

The Guppy's lights blink, turning to the second search leg. I mark the time on my plotting board. The Guppy will direct me in on any sub his powerful radar finds. I won't fire any ammunition, but afterwards the umpires—senior officers judging the maneuvers—will decide, on the basis of the action, whether or not we made a kill.

If the sub spots us first, he will use his one great advantage—submersibility—to escape. But in my bomb bays are gadgets to cancel out that advantage: sonobuoys. These floating radios are dropped in the water by parachute. They lower a tiny microphone below the surface and broadcast underwater sounds to the plane above. If the buoys detect submarine noises, I yell for the destroyers to pitch in with depth charges and explosive throwers.

This 48-hour operational phase began yesterday. I had a hop last night, and I must fight sleep. Time drags on. The Guppy's radio snaps me alert:

"411 SNARL, this is 408. Vector two-one-zero, distance to follow. Over."

I acknowledge the contact, and write down the heading I turn to—210 degrees. Barker (*Continued on page* 48)

what makes the pilot tick?

Military scientists are solving problems of stratosphere, supersonic speeds and space travel.

UNIVERSITY OF MICHIGAN LIBRARIES

HOW CAN MEN live and work 10 miles and more above the earth?

How can pilots use their normal faculties when moving faster than sound?

And how can they be alert and efficient in temperatures ranging from ultra-cold to ultra-hot?

On the correct answers to these and allied questions depends the effective striking power of the United States Air Force. To find those answers is one of two primary missions of the Air Force School of Aviation Medicine at Randolph AFB, Tex. The other mission is training.

Medical scientists say that any type of abnormal living causes stress on the human mind and body. What are the stresses to which flying personnel will be subjected? Generally they include high altitude, irregular motion, lack of oxygen, heat, cold, acceleration and deceleration, fatigue, vibration, and—in the field of space and atomic medicine—radiation. The problem of aviation medicine is to prevent these stresses when possible and to cure their effects when this fails.

The first job is to search for a means whereby the flyer, for a limited period of time, can carry his normal living world into regions where normal living as we know it does not exist.

For example, low pressure chamber experiments have shown the need and pointed the way to improved oxygen equipment, thus raising tremendously the altitude barrier. Modern air evacuation techniques developed at the School of Aviation Medicine have made possible the portable hospital and the mass evacuation of battle casualties, both tested in Korea.

Under the leadership of the school's Commandant, Brig. Gen. Otis O. Benson, Jr., who is flanked by a score or more of distinguished military and civilian scientists, some 76 aeromedical research projects are now in progress in the school's own laboratories. Aerobiology, biochemistry, radiobiology, pathology and psychology are a few of the broad fields of science which the school's experts are exploring for improved solutions to the problems of man in flight.

In the Department of Pharmacology, for instance, chemists work to perfect a method to keep milk from souring when removed from refrigeration. If the experiments are successful, air crews will have fresh milk on protracted missions.

Psychology experts are trying to isolate the accident-prone individual, and physiological scientists are working on ways to raise man's altitude barrier to the indefinite.

Studies in space medicine are perhaps the most spectacular of all the school's research. The word "space" is used to define the area beginning at that altitude above the earth's surface where, due to the absence of atmospheric friction, a balance is reached between gravitation and inertia. Bodies penetrating "space" will remain aloft of their own volition until guided back to earth. Rockets already have been hoisted into the periphery of space, and scientists say it is a matter of relatively little time until recording and transmitting instruments can be attached to carriers that will become artificial "satellites in space." This is the next and last step before the interplanetary space ship that will carry man as its passenger.

New flight nurses learn about rigors of Arctic nursing in cold chamber at −20°.

Why do radar operators err? Machine seeks answers by duplicating radar-scope.

How to swim with a Mae West is taught nurses in the event the plane ditches.

Because of limited physical facilities at Randolph, the School of Aviation Medicine has recruited experts and laboratories of many of the country's largest universities to supplement its own work. At present some 22 research projects under the aeromedical school's direction are being carried out under contract in major universities from coast to coast. At Washington University in St. Louis, for example, and at the University of Texas, clinical psychologists are seeking a means to measure human anxiety tolerance. At the University of Kansas Medical School, a new and elaborate machine built at the School of Aviation Medicine to measure normal and abnormal heart forces, is under test. It is the only machine of its kind in the United States. Cornell is working on a project, and the Universities of California, Southern California, Fordham and Illinois, to name a few, are doing other aeromedical research jobs for the Air Force school.

The School's Department of Pharmacology, under direction of Dr. Herman I. Chinn, has reduced from some 20 to six the number of drugs and combinations which appear to offer possibilities of effective protection against air sickness. This was done by an experiment which used troops aboard a U. S. transport during two Atlantic cross-

ings early in 1950. Hundreds of "burp" runs in aircraft, and months of tedious research were by-passed by using soldiers used to the rolling of an Army transport.

A new "oximeter," developed in the Department of Physiology by Dr. Kurt Kramer, is another recent product of the school. Known as a Photoelectric Hypoxia Warning Device, the oximeter uses the pilot's ear as a light filter and works on the same principle as an electric-eye door that opens automatically as one approaches. A photoelectric cell is attached to the shell of the pilot's ear, through which light passes, and to a red light on the instrument panel. When the pilot fails to obtain a sufficient amount of oxygen, his blood changes from a bright to a dark red, thus reducing the flow of light through his ear. The photoelectric cell is sensitive to this reduction in the flow of light through the ear and sets off the warning light on the instrument panel. The instrument is set to allow the pilot time to take corrective action.

Virtually every air evacuation plane operating in the Far East today carries an Air Force or Navy Flight Nurse trained at the Air Force school. Also aboard in most instances are a Flight Surgeon and/or an Aeromedical Technician, trained in the School of Aviation Medicine.

The aeromedical school's own psychologists have contributed directly to the development of psychiatric screening tests and studies of pilot efficiency under stress conditions, all of which help the Air Force put the right men in flying jobs.

All these specialized aspects of aviation medicine require specialized personnel. Most are trained at Gunter AFB, Ala., where a branch of the School of Aviation Medicine was established last October under command of Col. Robert J. Platt. A total of 362 officers and airmen were graduated from the aeromedical school's various courses during the 1950 calendar year. These included 154 doctors who left the school as specialist in aviation medicine. The bulk of these, 137, were trained as Aviation Medical Examiners. Although the examiners now leave the school after six weeks training, they do not receive their AME ratings until they serve three months in the field. After getting their AME ratings the graduates are eligible to become Flight Surgeons when they complete an additional year of field duty and get proper recommendations. Most AME and Flight Nurse classes include one or more foreign officers. Most of the foreign Flight Nurse students come from Canada but the medical officers have come from 31 countries around the world. The last AME class, for instance, included for the first time an officer from Iran. Another class included two Egyptian officers.

A unique custom has sprung up in recent years. Foreign nationals have presented the school with the flag of their country. To date the USAF School of Aviation Medicine has accumulated flags of 21 foreign nations, probably the largest collection of foreign flags of any U. S. military institution. END

New-type oximeter warns pilot short of oxygen, was developed at Randolph Field.

UNIVERSITY OF MICHIGAN LIBRARIES

LOVE IN A WELLINGTON

By RUTH BALLARD

ATA pilot got her man but almost lost a British bomber trying

BACK IN ENGLAND in 1940, I joined an odd conglomeration of pilots called the Air Transport Auxiliary. At that time, there was a great shortage of pilots of any description. The air force was overtaxed already without tackling the problem of movement of aircraft from A to B, so the A.T.A., commonly known as "Ancient and Tattered Airmen," came into being.

In those early days, about 50 per cent of the personnel were Americans who had jumped the gun and came over before the U.S.A. was actually involved in the war. We also had a smattering of Free French, Poles, Czechs, Indians, and even a few females. With few exceptions, most of us were no more than amateur light airplane pilots before the war. To our constant amazement, we were thrust into a wide variety of military aircraft with little or no conversion training. We had no radio and no crews, and it says much for the modern fighting machine that there were remarkably few casualties under the circumstances.

It happened that in 1941, I was posted to a station called Ratcliffe, near Leicester in the Midlands. Through some oversight, I was the only skirt on the station at the time. Since there was no competition, I had no trouble starting a bit of romancing with one Edwin Ballard, a Yank from Massachusetts. Everything was going along nicely when Ed's leave, which he was entitled to take in the United States, came up. Off he went for two weeks. I was left wondering whether he was just an episode or whether his intentions were serious enough to withstand the blandishments of hometown belles.

I knew he would return by air to Prestwick in Scotland. Our unit had quite a lot of trips in that direction which were not normally sought after. The weather was always uncertain in the North, and one might be stuck out in a Scotch mist for days, away from the comparative comforts of the base.

Round about the time Ed's two weeks were up, I became a regular eager beaver. Up and down to Prestwick I went, hoping to be stuck for a day or two until his plane came in. But the weather would clear right up and I would have to take a return trip south. Finally, my persistence was rewarded. I checked in at Prestwick Operations one day, and they said:

"Oh, by the way, one of your bunch just came in from the other side, American called Ballard, wanted a lift to Ratcliffe. But the best we could do at the time was to get him as far as Liverpool in a *Hudson*. A *Wellington* has just come on the books to go all the way south. Will you take it, pick him up on the way and get him back to his base?"

Normally, I should have beefed at this request. The field at Liverpool was surrounded by barrage balloons and invariably enveloped in thick smog, so I did my best to appear as reluctant as possible.

"If I must, I must I suppose. Give me the collection chit for the *Wellington*, and I will be on my way."

Once out of sight, I could not move fast enough. I retrieved my airplane from its dispersal point in a sea of mud miles from the runway. I almost got it bogged in my haste but finally emerged triumphant onto the perimeter track. The *Wellington* is a large and rather lumbering twin-engine bomber, but that day it (*Continued on page 57*)

With 1500 r.p.m. and the Lycoming registering 2100, our check pilot was airborne in the Rawdon in 300 feet without flaps.

The Rawdon T-1

By ED HOADLEY

HAVE YOU ever seen a conventional trainer-aircraft that could be converted into a professional sprayer-aircraft in four inexperienced man-hours, and then back again to a conventional trainer in less time than that? I have.

It's the new Rawdon T-1, which is fully licensed for training and pleasure, or commercial spraying. You don't call in the nearest A&E, Designee, or CAA Inspector, and pay bills for each licensing. Anyone can make the conversion, and a simple log book entry covers the entire alteration. As gentle Gene Rawdon, co-owner of Rawdon Brothers Aircraft Company, Wichita, Kan., expressed it, "This airplane is licensed in a *dual* category."

Back in 1942, Herb and Gene Rawdon operated a medium-sized airport on the eastern edge of Wichita, across the street from the bulging Beechcraft factory. In fact, Herb is one of the big aeronautical engineers for Beech today. The brothers dreamed up a new-type trainer similar in design, but entirely co-incident with the then-new Fairchild PT-19 aircraft. By 1943 they had put the first trainer into the air.

I had spent a few dollars at the Rawdon airport early in 1943 to keep up on my flying, and had on occasion watched them sweat out one problem after another. After it flew, they put some 1,000 hours on it before being sold. One of the new, re-vamped T-1s has 300 odd hours on it, and still has no CAA bulletins on it.

It was my privilege to check fly the new Rawdon with Jack Chastain, chief test pilot, who doubles in brass as shop superintendent. Jack had built up a national reputation as an aerobatic pilot, so I felt quite comfortable with him. The Rawdon we used was a shiny, hand-rubbed, midnight blue, with rowdy red wings and trim.

I climbed into the front cockpit, slid into an Irvin bucket chute, adjusted heavy Army seat belts, and awaited his instructions. Before me was a smallish shock-mounted instrument panel with the usual flight and primary blind group instruments, plus manifold pressure gauge.

On my left was the throttle quadrant, consisting of the army-type throttle lever, a five-inch metal wheel for elevator trim, and a crank for mechanical flaps (10 turns for 30°. The mixture control button was forward left, with the carburetor heat button balancing it on the right.

At the lower right were located the switches—master, generator, navigation lights, and covered starter button. Also in a neat row were the breaker switches for all circuits. Wobble pump and gas shut-off valve were located on the lower left side near the floor. The rear cockpit was a duplicate of the front.

Mixture full rich, a couple of shots of primer, wobble pump, master and generator switches on, I followed through on Jack's instructions. I pushed the starter, and with the propeller revolving, fed in the magnetos. The McCauley standard pitch propeller started rotating immediately. With fuel pressure up to four pounds and Jack tied in the rear cockpit, I taxied out.

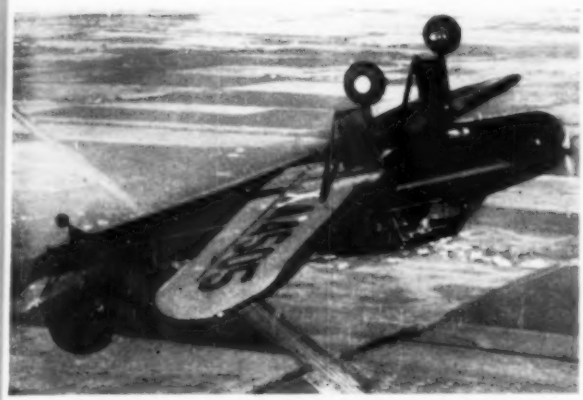
There was a wild Kansas wind blowing. A little earlier the weather station had reported 34 m.p.h. from north-north-west, with gusts to 42. The day before a gas station attendant told me that the 30-mile wind we currently had was "calm."

The high wind worried me as we taxied out. However, cross-wind taxiing is accomplished very well on this low-wing job. I had to hold a little down-wind rudder and brake, but it didn't seem to matter about the position of ailerons or elevator. All the high-wing airplanes on the airport were tied down.

FLYING's CHECK PILOT

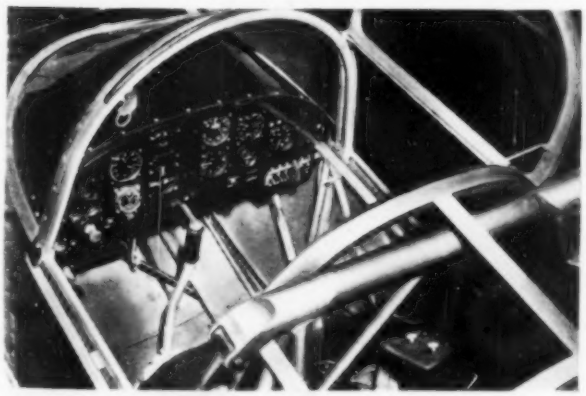
EDITOR'S NOTE

This series of articles is planned to help the pilot and prospective plane owner evaluate aircraft now on the market. Authors evaluate each aircraft through the eyes of the average private pilot who flies a plane for business or recreation



Aerobatically, the T-1 is a good performer, as this photograph indicates. It is stressed for such flying.

Traveling down-wind at an altitude of five feet, the Rawdon (above) sends out a shower-bath spray from its 10 nozzles. It carries 75 gallons of spray liquid. Instruments (below) are well grouped, easy to reach.



Magnetos were checked at 1,500 r.p.m. and wide-open the Lycoming registered 2,100. I looked back at Jack to see if he were ready, and noticed that he was within arm's length. The bucket seats are close together under the canopy, and we had no particular difficulty in talking. There was no need for signals or Gosports.

Gingerly I opened the throttle. We were airborne in some 300 feet, after three hops and no use of flaps. Jack had mentioned that flaps were of doubtful value on take-off.

Gathering speed as we flew down the runway, I pulled her back into an erratic 70 m.p.h. climb. I say "erratic" as I wasn't quite sure what should be the best climbing speed. It was me, not the airplane.

I leveled off to the left at 400 feet, and broke traffic at 600 to the north-west. I suppose Jack was grinning, for every pilot around Wichita knows about the right-hand pattern at Rawdon's. However, Jack was patient, and we moved on up to 2,500 feet above the ground (3,900 feet, indicated).

As we climbed, I tried to coordinate stick and rudder. To me it felt like a PT-19 Fairchild, only you don't have to "boot it" to get results. The Rawdon has a light aileron control that was right with me all the way. It didn't take much rudder to coordinate, but I needed the rudder. Somehow it reminded me of the Aeronca *Champion* system as far as feel goes, only more sensitive. This is a faster airplane.

It was difficult for me to get the nose in down position for cruise. The nose had been about even with the horizon in the climb, but now it had dropped to some 12 inches below it. I ran the trim wheel forward, checked rate of climb and altimeter, but the airspeed hung on 110-115 m.p.h. indicated.

As I relaxed in my seat Jack leaned forward and said, "Ed, I don't believe you've got it down yet."

I watched the metal wheel roll forward a couple of turns, and as I watched, the nose dropped on down about fifteen inches below the horizon. This was level flight. We were cruising at 117 m.p.h. indicated, with 22 inches of manifold pressure, and the altimeter was pegged on 4,000 feet.

I tried gentle turns. Coordination on every strange airplane requires practice. However, equal pressures seem to be required. About as fast as I could get the stick over the wing was down. From these I pulled the stick over into alternating medium, and steep turns. The T-1 rolled into a 60° bank, and with much back stick, headed back toward the opposite direction. When you get on to it, coordination is easy.

We went into the stall series. Stalls, flaps up, are sharp, but break clean. There is a slight hesitancy as the airspeed passes through 60 indicated. At 50 m.p.h. this airplane breaks, but with a little easing off of the stick she comes back into control again with little loss of altitude. In all the stalls I tried, the total loss of altitude was 200 feet.

I tried a maneuver or so in the Rawdon but was not quite at ease, so I asked Jack to do a wing-over. After building up speed, he eased the stick back and, as we looked forward past the vertical, the Rawdon heeled over to the left and pulled out into level flight. Aerobatically speaking, the Rawdon performs.

Gliding from 2,500 feet, I reached for lots of carburetor heat, even though Jack had mentioned that as the manifold is bathed in hot oil heat is not required. The Lycoming was faithful and we worked through a series of turns at 75 m.p.h indicated. I didn't (*Continued on page 49*)

Airborne Philippine Missionary

USAF rescue plane prepares for landing in Palanan to help the Reverend Spotty after his second crash.

The thrilling story of a persistent Methodist minister's flying experiences in primitive northern Luzon

By VIVIAN CANNON

BACK IN 1946, Rev. Curran L. Spottswood of Mobile, Ala., a Methodist minister of Gainesville, Fla., got the chance to become a missionary in the Philippine Islands. As he accepted, the Reverend mused:

"If the Air Force and the business world use our most modern mechanical methods to make progress, why shouldn't I?"

So, the enterprising Reverend learned to fly.

Reverend Spotty, as he is called, soloed himself right into the title of "The Flying Sky-Pilot of the Philippines." He held that title for five years. From 1946 until this year, he was the only American missionary in the Philippines who used an airplane to carry the word of God to several thousand natives.

He literally "barnstormed" all over Northern Luzon—his mission field—and piled up enough flying hours to take him almost all the way around the world. Reverend Spotty flew over more than 25,000 miles of dense unexplored jungle and over mountain ranges that rise to 10,000 feet. Ninety per cent of that distance was logged on hops from Tuguegarao, his home base, to all points of his mission territory.

Reverend Spotty used native-mowed fields for landing strips, as well as narrow roads, rocky river banks, and abandoned military strips. All nested in areas where trees were so high and close that a searcher on the ground could not see a wrecked plane within 10 feet. This made it doubly dangerous for him, since he had four forced landings in one month and three crashes—two of which demolished his planes.

But despite the hazards involved, each mission was another step toward progress, slowed only by an understandable lethargy on the part of people just freed from Japanese occupation.

The Reverend's plane never left the ground without some kind of cargo to help the islanders find God and a more comfortable mode of living. Often, he carried a load of educational films which introduced and taught new methods of simple farming and sanitation procedures. His plane was frequently loaded with milk and medicines for distant villages. Occasionally, he converted his ship for use as a flying ambulance.

These jaunts may seem far off the path leading to a Christian-way of life. One imagines a missionary delivering his sermons from a thicket and holding regular Sunday School classes in grass huts. But as Reverend Spotty puts it:

"Christianity gets pretty practical when you're in the field. You can't instill the ideals of a christian life into a person who is starving to death or whose family is dying of disease."

Rehabilitating the people was a very slow job in spite of his modern mechanical ideas, but the plane proved to be the great help he had anticipated. It cut out several-day hiking trips through dangerous, uncharted jungle country and the same journey could be made in an hour or so by air.

In 1947, for instance, he started out on foot from Tuguegarao for Palanan, about 300 miles or four days away. Three days out, he and his native companions ran out of food. To make the pangs of hunger even worse, they kept stumbling over human bones. Later, Reverend Spotty learned these were the remains of starvation-killed Japanese soldiers who had hid from American invasion forces during the war.

His party finally made it to the coastal village because "every time I saw a skull or arm bone I felt stronger." There was a famine in the town though and more hiking had to be done before they found food.

From then on, Reverend Spotty made all other trips to the same spot in his airplane. He learned also from this one hike to make all exploring trips by air, also. But it was when he ventured into new territory, that his plane really proved its worth.

Practically all of his missions took him into uncharted areas. The seemingly large number of towns spotted on maps of the Philippine Islands are chiefly water holes and overnight stops for (*Continued on page* 47)

Reverend Spotty (top) greets some associates after landing in Palanan, Philippine coastal village. He poses (bottom) with friendly Negritoes. The woman in the dress is a new convert, result of airborne mission work.

Natives help the Reverend upright the "Circuit Rider" after its last flight.

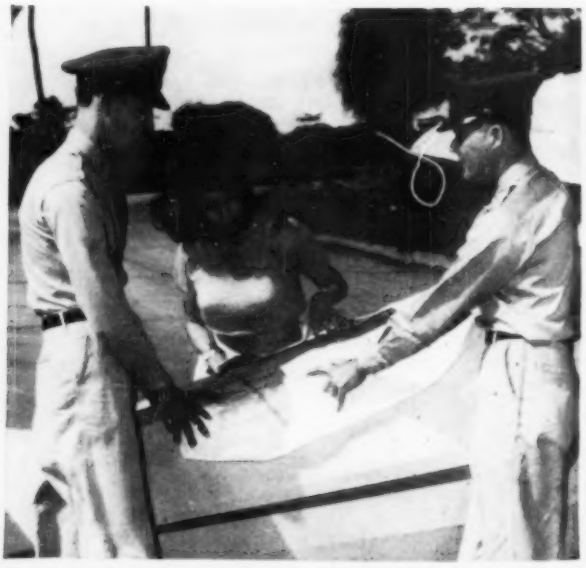
Mrs. Dejon Browne watches Cpl. James Thompson and Club President, Sgt. Bill Roush plot a cross-country Caribbean flight.

A Charter member of the club, Mrs. Charlotte Fouts, gets pre-flight instruction from CAA Instructor Lieut. James H. Devlin.

Club cooperation is shown as Mrs. Browne, Cpl. C. D. Howse, Sgt. Don Crabbe prepare Aeronca for day's flight activity.

Flying

Awaiting Tower's taxi instructions, Mrs. Jerry Thompson, flying-devotee wife of a Ramey airman, gets ready for her flight.



Backed by Puerto Rico's ideal flying weather, Pvt. John Horton, Mrs. Fouts, and Lieut. Devlin check routes for an island trip.

Ramey Flying Club's Aeronca has just returned from a sightseeing flight over the lush tropical landscape and historic scenes that make Puerto Rico a paradise for the Club's private flyers. The pilot is receiving parking instructions from the Club's lineman.

g in Paradise

A major problem among airmen and their families at isolated Air Force bases around the world is leisure time and how best to use it.

The following article explains how airmen at one such base helped to solve that problem by establishing, of all things, a private flying club. Forming a flying club at an Air Force base seems, at first glance, like carrying coals to Newcastle. But members of this club don't look at it that way.

If you're now serving at a remote base where the program of extra-curricular activities is limited, why not consider a flying club. The author tells you how to do it.—THE EDITORS.

By CAPT. DON BROWNE

Sgts. Roush and Dunlap give engine maintenance pointers to novice Sgt. Glenn Sampson, as part of the Club's training plan.

THE postman's holiday—that's for airmen and their dependents at the Strategic Air Command's Ramey Air Force base down here in romantic Puerto Rico. Situated on the extreme northwestern end of this Caribbean crossroads, Ramey is an ideal operations center for private flying through islands of the Spanish Main. It is an area of tropical splendor, where mountains rise majestically above palm-bordered beaches and flowers bloom riotously the year round.

We formed our club last February to provide additional recreational and educational facilities and to help promote private flying on the island. It also has boosted morale.

For the benefit of personnel at other bases way off the beaten track, I'd like to tell you how we got started.

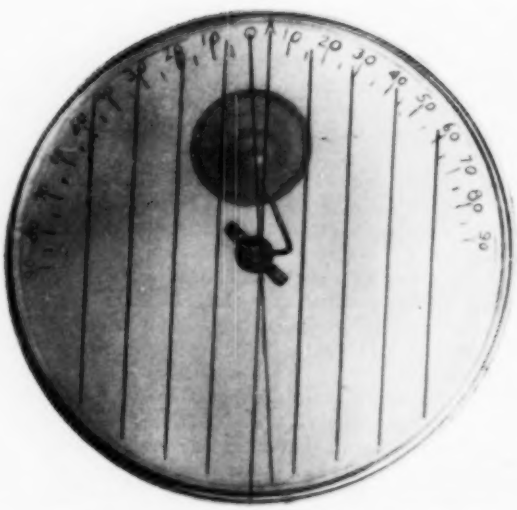
First, we asked Col. Richard T. King, base deputy commander, for permission to form the club. He gave it wholehearted backing. Then, we sought advice from the Civil Aeronautics Commission's safety agent in the San Juan region.

The CAA's response was immediate and gratifying. At our very next meeting, Carl T. Tauch and Karl Lindeman of the CAA arrived at Ramey equipped with tests, license applications for pilots and mechanics—and stenographers. In addition to offering all the services of their office, they took a personal interest in the club. They gave us only legal and common sense advice (*Continued on page* 61)

Cheese-box Navigation

By ALICE S. FUCHS

Whither are we drifting? Or, what happens when a gal, handy with toolkit, gets 78 cents and an idea.



The completed guidometer no longer looks like a plastic cheese container but like a professional instrument that can be used as a drift meter. Mount it on the side window of the plane, just below eye level with discs in horizontal position. But to

SO YOU think a drift meter is an expensive instrument for the exclusive use of large fast airplanes?

Think again, pilot. You can walk into any well-stocked grocery store and get the principal ingredients for making a handy little navigation instrument, especially suited for lightplane use, that will do practically everything the fancy $500 drift meters will do, and a few tricks stolen from the radio compass besides.

The cost of this fabulous instrument? Less than the price of a gallon of gas. The time required to construct it? About an hour. The time for installation in aircraft? Sixty seconds.

But be not deceived by the cheapness or ease of construction and installation of this ingenious device, which we shall call the "guidometer", for lack of a better name. It has remarkable versatility.

It consists essentially of two superimposed transparent discs marked with degrees and guide lines and attached to the side windshield or top of the instrument panel by a rubber suction cup.

First step for the would-be guidometer builder is to visit the local supermarket and pause in front of the cheese counter. Select a type of cheese commonly sold in aluminum-wrapped segments packed in a circular, clear plastic container about 4½" in diameter and ¾" high. Borden's Gruyere Cheese comes in a 6 oz. container of this type. Buy two containers of cheese.

We assume that you will eat the cheese (if you're a cheese lover), or else use it to bait mouse traps, or give it away to friends, so we have not included price of the cheese in our cost estimate. Any objections? Oh well, count it in, then. What's a mere 78c to a wealthy pilot?

Now if you can beg, borrow or steal two of the waxed pencils (black and red) used to mark prices in the fruit and vegetable section, you'll find them useful later on. However, a child's wax crayons will do as well.

On your way home from the grocery store drop in at the local auto supply store. Buy a 1½" rubber suction cup (cost, about two for a nickel), a ⅛" round-head bolt about ½" long with a washer and ¾" wing nut (about 5¢), and 10" of copper wire approximately $\frac{3}{32}$" in diameter. You can use electrician's wire for the latter and scrape off the insulation.

Aside from the articles purchased, collect a screw driver, a straight edge, an ice pick or sharp pointed instrument, a protractor, a ⅛" drill and a soldering iron or tube of liquid solder.

On the outside of the bottom of the lower section of one of the plastic boxes, scratch a straight groove marking the diameter. Then around the edge, starting from one end of the diameter as the zero line, mark 90° by 5° lines, to the right and also to the left. Put in the figures for the 10° lines, but a small mark for the 5° will be sufficient. Having scratched this onto the plastic with the pointed object, rub over the surface with a black wax pencil or crayon and then rub off with a cloth, leaving the marks colored black.

Remove the top from the box and drill a hole in the exact center. Bend and solder one end of the copper wire around the head of the bolt, slip on the washer, insert bolt in the hole from the outside, and screw the wing nut on the inside. Then attach the other end of the wire to the end of the rubber suction cup. Place the bottom and top of the box together.

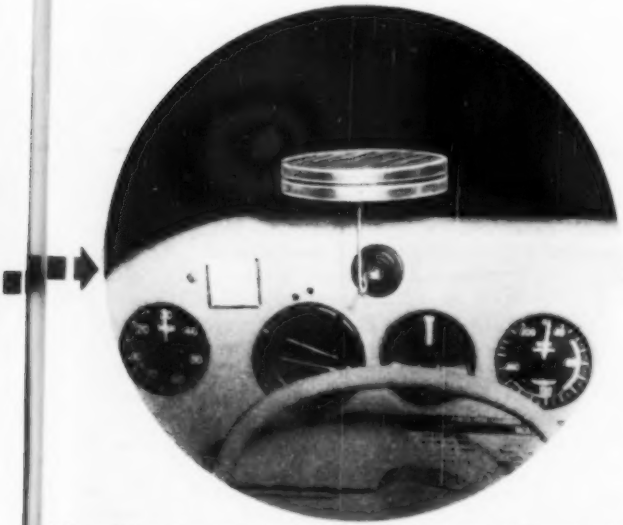
Next take the top from the second cheese box and discard the bottom. Scratch the diameter groove on the outside of the top and point it with an arrow on one end. It will be easier to draw this line accurately if you first place this disc over the bottom of the first box with the black lines. Then make similar grooves ⅜" apart *parallel* with the diameter line and on both sides of it. With a red wax pencil or crayon, color these lines red in the same way you colored the previous disc black.

Place the red-marked top over the black-marked bottom, if you have not already done so, so that the top can be easily rotated to line up the markings. Your guidometer is now complete.

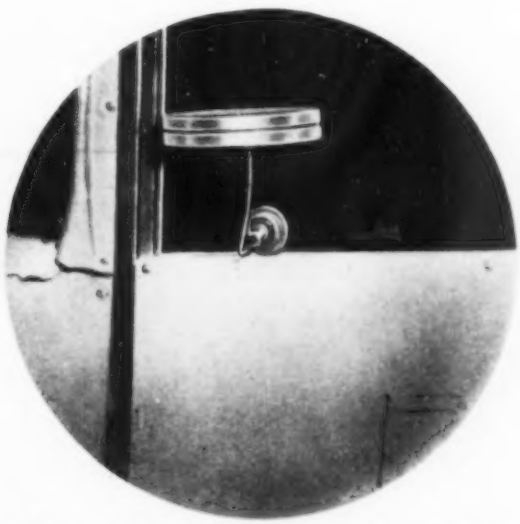
To install in the plane, simply moisten the rubber suction cup, stick it on the side window or the top of the instrument panel, depending on the particular problem you wish to solve, and bend the wire so that the grid is in the horizontal plane. The instrument is ready for use.

When using as a drift meter, attach the guidometer to the side window of the plane, slightly below eye level, and bend the wire so that the discs are in a horizontal position and the black zero line of the lower disc is lined up with the longitudinal axis of the airplane.

Looking through the discs toward the ground out the side window, revolve the upper grid so that the objects on the ground appear to move (*Continued on page* 52)

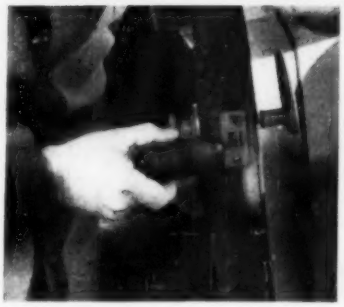


take **relative bearings in determining fixes and distance, the guidometer is attached to the instrument panel. When placing**



the meter on the right window of the plane, a traveling companion can be put to work to do the navigation for the pilot.

The cabin of this Bonanza is an example of good housekeeping. It is neat and efficient.



Dry graphite powder, in small tubes, is excellent for lubricating door latches.

Never wipe off plastic enclosures with a dry cloth. Wash and rinse, then polish with a wax.

Complete canvas cabin covers prevent entry of dust, keep sun from fading exterior.

Lightplane Cabin Maintenance

By GILBERT CLOSE

EXAMINE THE CABINS of any 10 lightplanes that have been in use a year. Five of them will need cleaning. Two or three will need new windishields, and half of them will have yellowed and crazed cabin windows. Slap the upholstery in all 10 and at least eight will show a cloud of dust.

Careless cabin maintenance seems to be a normal human frailty. You won't have your license revoked because of dirty fabric, a ragged floor mat, loose luggage straps, or a greasy scum on the control wheel. The door hinges may squeak and the latch spring may be so gummed up you have to turn it into place. The canopy may require a 60-pound pull to slide it, and you may have to avoid a wad of gum every time you take your place behind the control wheel. The CAB inspector will overlook all of these defects and issue you a license regardless.

But to the pilot who likes to fly and who is proud of the performance and appearance of the airplane he owns, such carelessness is anathema.

There it nothing technical about cabin maintenance, nor does it require a lot of time. As soon as a rattle is heard it should be traced to its source and eliminated. Though cabin rattles or squeaks are bothersome, their discovery will usually dictate the cure.

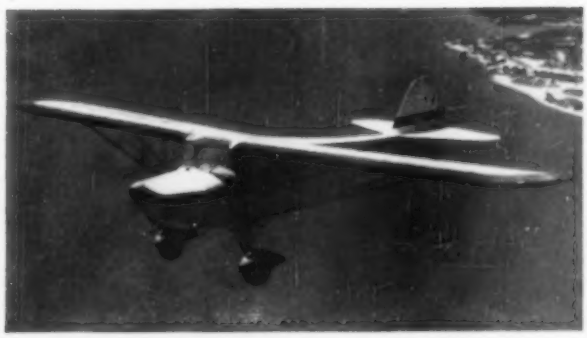
Squeaky or hard-working door hinges can be remedied by a slight application of penetrating oil. After the oil has had time to penetrate the joint, wipe off all excess to prevent it from gathering dust. Sticking door latches and canopy slides can usually be cured by dry graphite powder obtainable in small tubes which puff it into the joint. This graphite powder should be used sparingly and all adjoining surfaces wiped with a dry rag after application.

All cabin fittings should be inspected periodically for mechanical condition. Fluid lines leading to the instrument panel should be inspected for leaks, and all lines and wires leading backward (*Continued on page 6*)

HAVE YOU SEEN?

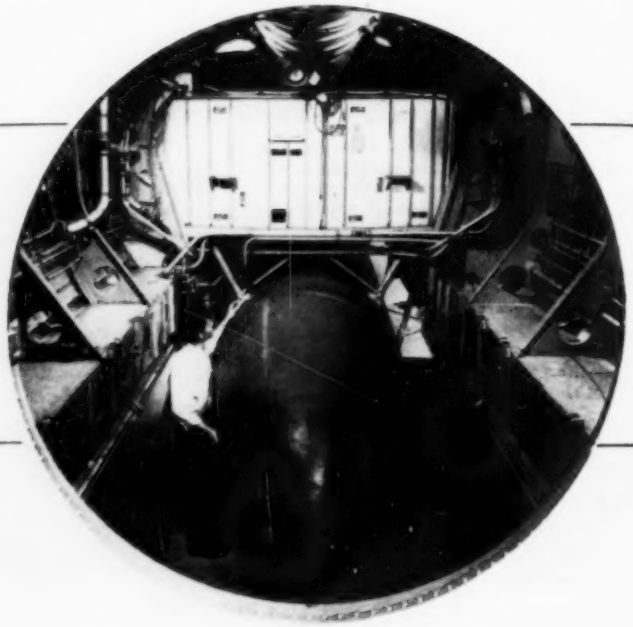
Bell's X-5 flying laboratory jet is the first aircraft equipped with wings that can be swept back in flight by the pilot. For takeoff, climb and landing, best performance is with wings in forward position as shown at top. At high altitudes, pilot can increase sweepback for greater speed. Unlike the rocket-powered X-1, the X-5 is jet propelled.

Latest four-place lightplane is Taylorcraft's trim Tourist. It has 150 h.p. Franklin, cruises at 115.



Taylorcraft's two-placer is the Sportsman. It has Continental 85, and cruises at 105 m.p.h.

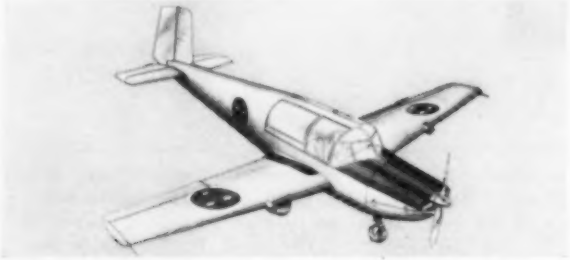
How three types of military aircraft are refueled in air. Shown at top is North American's RB-45C Tornado taking on fuel from a Boeing KB-29P tanker. Below it, a Boeing B-47 Stratojet extends its range by drinking fuel from a KC-97A tanker through a Flying Boom. At right, Republic's F-84G is first operational fighter equipped for refueling.



A 44,000 lb. bomb in a special cradle in the bomb bay of a Superfortress. The bomb is so large it extends from front to rear of the bay and hangs below the contour of the B-29. This view, the first released, shows the method of attaching the bomb to the Superfortress during a recent flight test.

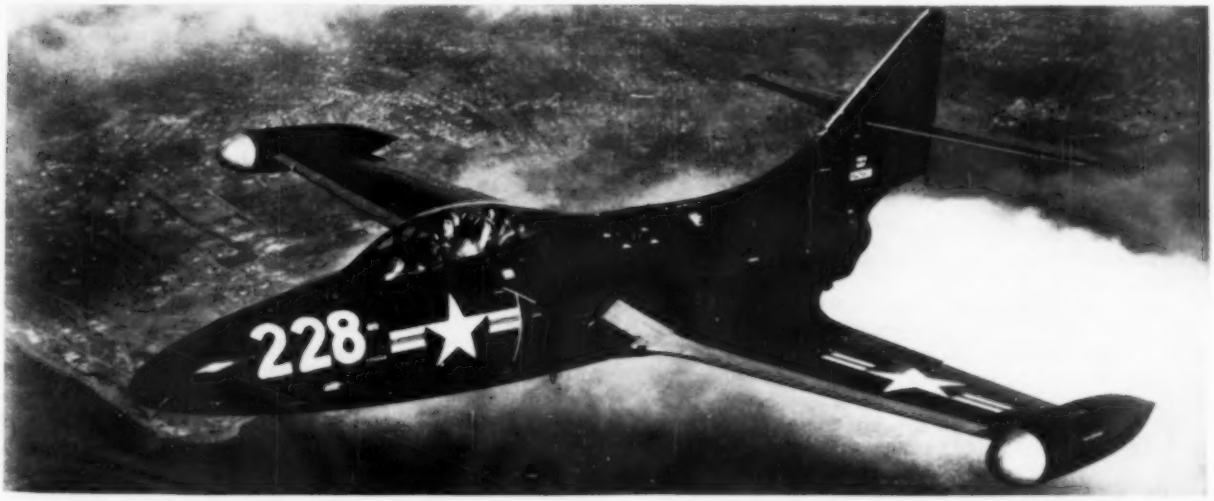
The Grumman Albatross triphibian demonstrates ability to take off from water with its snow-ice skid extended.

Evolution of a French transport. At top is the original Bretagne with twin-tail and piston engines. Below it is the modified plane with two Nene jets and single tail.



A new and more powerful version of Saab's Safir, all-metal 3-seater, has been ordered by Swedish Air Force.

Latest version of Fairey Firefly is three-seat anti-submarine aircraft with Rolls-Royce Griffon engine.



Sleeker, faster and more powerful is this newest version of the Grumman F9F-5 Panther. It carries J-48 jet engines.

I Learned About Flying From That! NO. 141

Colonel Donahue is a former pilot on Eastern Air Lines and has logged over 7,000 hours. He flew with ATC during most of World War II.

By VINCENT J. DONAHUE

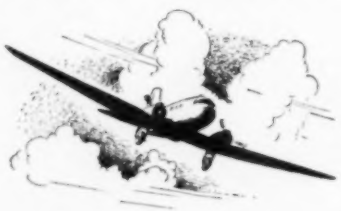
A lieutenant colonel in the Air Force, the author is now flying with MATS on a route from Moffett Field, Calif., to Far East.

It just couldn't happen. He had staked his life on a four-cent needle!

WHERE was I?

A good question. And an embarrassing one considering the fact that the bird colonel I worked for was sitting in the right seat of the C-47 with an unhappy expression on his face. Obviously he didn't know where we were either, but he did know that we weren't where we were supposed to be some 20 minutes earlier.

This couldn't happen, I told myself. I was no boy trying to do a man's job. I had been knocking around in the Air Force for 10 years-plus, had flown for a scheduled air carrier for a number of years, for MATS all over the world—and yet here I was, lost. Adding insult to injury was the fact that no weather was involved in this little deal. Some haze and smoke cut the visibility down to three or four miles, but other than that the weather was perfect. The poorly healed fractures in my ego still ache when I think of that fiasco.



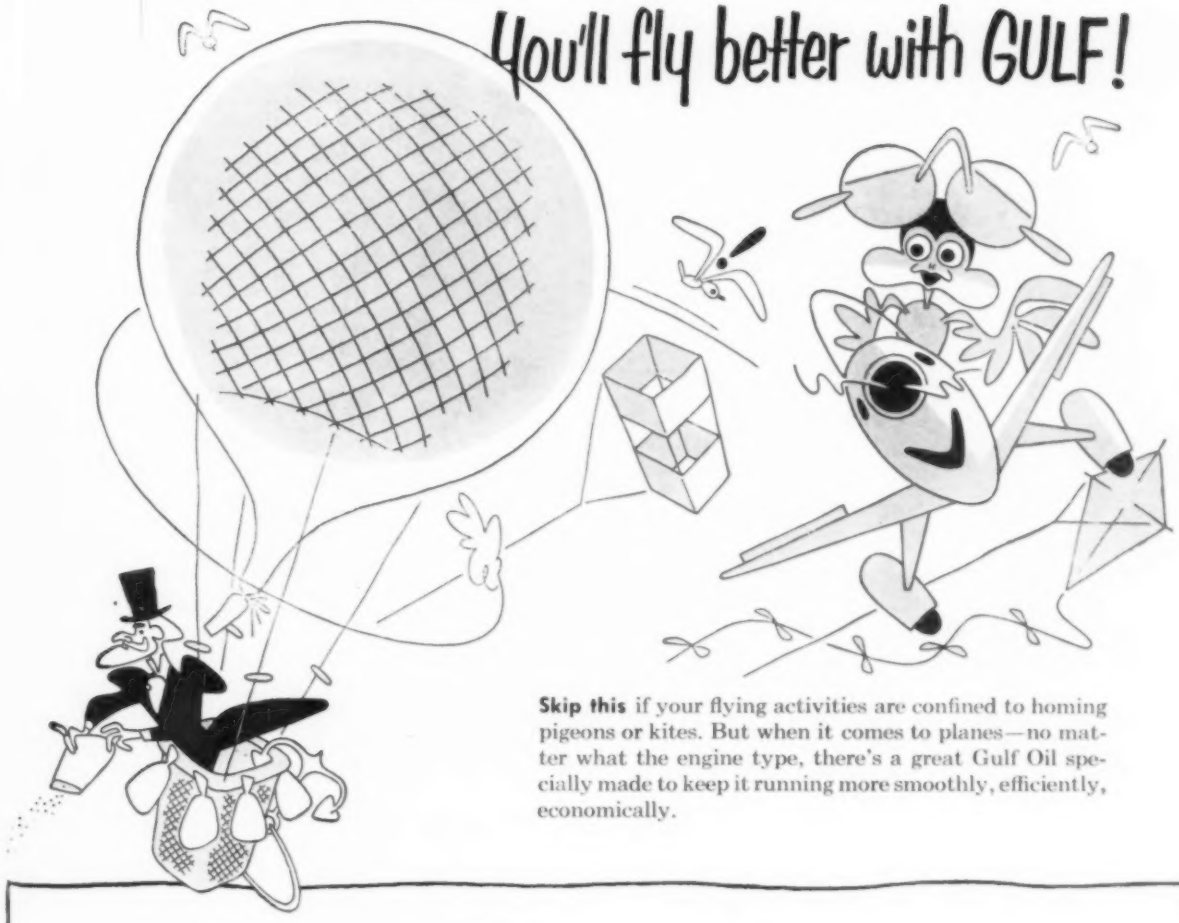
We were out of Kelly AFB near San Antonio, Tex., in a Charley 47 en route to Scott AFB outside of Belleville, Ill. I had been on deck in Operations for an hour before the Old Man got there. The scheduled trip was not a new one for me. I had made it several times since having been assigned to the San Antonio area. From the experience of having flown with this colonel before, I knew I would get to fly the northbound leg. We usually returned at night, and he liked to get the night time. So I consulted with the rainmakers in meteorology, then made out a neat little IFR flight plan, a standard practice with me even when the weather is good. I filed via Bryan, Tyler, Texarkana, Little Rock, Walnut Ridge, and Advance, rather than direct. The paper work out of the way, I lit up and began to enjoy my cigar. It was a lovely day and everything was under control. But not for long.

A staff car abruptly pulled up in front of Operations and the Old Man piled out. Apparently he was in a bit of a hurry that morning. He charged into Operations, glared at the accomplished flight plan at the counter, and snapped, "We're going direct this morning." Then he headed for the plane at a fast clip.

I gulped, mumbled something in keeping with the best tradition of military courtesy, made a few hasty marks on the flight plan (changing it from IFR via the stations already noted to VFR direct) and lit out after him. I made a hurried visual check of the airplane, even though the colonel was already in the front office, inspected the chutes on the deadheads, and clambered aboard. A quick check of Form 1A disclosed that the airplane had not been refueled after a local hop the night before, but the 700 gallons on board was still enough for the trip. So rather than add to the Old Man's agitation I kept my mouth shut.

The colonel was probably (*Continued on page* 62)

If it's a plane you're flying—
You'll fly better with GULF!



Skip this if your flying activities are confined to homing pigeons or kites. But when it comes to planes—no matter what the engine type, there's a great Gulf Oil specially made to keep it running more smoothly, efficiently, economically.

Gulfpride Aviation Oil—Series D for Horizontally Opposed Engines!

It's the world's finest detergent dispersant aviation oil, the only one put through Gulf's exclusive Alchlor process to remove extra carbon-and-sludge-formers. Users have increased periods between overhauls up to 100%! You can't get a more efficient, economical aviation oil!

For Radial Aircraft Engines, there's Gulf Aircraft Engine Oil—Series R!

Highly effective in retarding carbon and sludge formations in radial engines! This fine quality, non-detergent, straight mineral lubricating oil maintains its body at high operating temperatures. Especially recommended for maximum operating periods between overhauls!

For MORE Flying Pleasure Don't Settle For LESS Than GULF!

The correct Gulf aviation oil will solve your lubrication problems. Once you've tried it, you'll agree!

GULF®

It's great to go flying with GULF!

GULF OIL CORPORATION . . . GULF REFINING COMPANY

AIRCRAFT OWNERS AND PILOTS ASSOCIATION

AOPA NEWS

Aircraft Owners and Pilots Association is a service organization for the private pilot or aircraft owner. AOPA's full time staff is devoted to helping the individual pilot. Its aim is: "To make flying more useful, less expensive, safer and more fun."

Headquarters address is: Box 5960, Washington 14, D. C. Members also receive a special AOPA edition of FLYING, newsletters and confidential aviation data. Opinions expressed in this column are not necessarily those of FLYING Magazine.

NEW AOPA FEATURES

Three important AOPA developments have just been announced to members by national headquarters:

1. New *Active Membership* category. This is a $10-per-year membership; the *Regular Membership* remains at $5 per year for the present. The Active Membership has been designed for those AOPA members who participate in aviation to a considerable extent, and who have need for a number of special services. The new classification gives the Active Member a number of added services over what he gets today. Full details being sent members in a special mailing.

2. *AOPA Foundation* now is collecting funds with which to conduct or finance scientific projects designed to make the present-day civil airplane safer and more useful. The Foundation is a non-profit organization operating independently of AOPA itself, and donations and contributions are to be used only for aviation safety projects. It is contemplated that money donated to the Foundation, incidentally, can be deducted from the donor's taxes.

3. *Emergency Pilot's Registry.* This is to be a select group of specially-qualified AOPA members who can serve on immediate call in the event of civil defense, disaster, rescue, or other civil air lift requirement.

Further details on all these projects are being supplied AOPA members.

LOW-FREQUENCY RANGES

One of the more heated battles to rage in Washington aviation circles recently is over the CAA's proposed decommissioning of low-frequency radio ranges.

Not long ago CAA suddenly announced they were contemplating shutting down 53 low-frequency ranges, and had already asked their regional officials for the names of stations that should be dropped. As soon as AOPA got word of the plan, a strong protest was sent CAA Administrator C. F. Horne (AOPA 77197). AOPA contended that the present status of omni does not permit the decommissioning of low-frequency ranges with safety.

Soon after AOPA's protest, two important policy-making meetings on the subject were held in Washington. AOPA participated in both, and again made a strong plea for the retention of all low-frequency ranges until such time as the omni system proves reliable and gives safe coverage.

AOPA found itself in the unusual position of contending that omni has not yet proved itself an adequate substitute for low-frequency ranges, while also being one of the first aviation organizations in the world to promote the omni system. An AOPA Pilot's Service Bulletin on omni has been used as a layman's handbook on the subject for more than two years.

Present status of the low-frequency shutdown program is that there will be no decommissionings before February, 1952. After that, some decommissionings will be approved on the basis of a five-point priority list—and those approvals will be made only after consultation with all users of the airspace.

IDENTIFICATION CARDS

September 1 is the deadline for all pilots to have their new CAA identification cards. AOPA has been handling large numbers of inquiries about these cards, and has published detailed procedures for getting them. Most of the confusion among pilots is due to the fact that they have not read instructions carefully, or have followed unofficial advice or rumors, only to find themselves more confused than ever.

AOPA has several times advised all pilots that they must apply for their identity cards in person to a CAA agent; they can *not* handle them through the mail.

ACCIDENT PRONE

One of the greatest causes of ground accidents to planes is the careless starting of engines without a pilot at the planes' controls. A detailed report on the problem has been given AOPA by its insurors, the American Mercury Insurance Co. ("Americo"). Americo's president, G. C. Whalen (AOPA 20628), has asked AOPA's help in educating pilots and plane owners to the dangers of starting planes in this manner. Commenting on the problem, Whalen said:

"Starting aircraft engines without a pilot at the controls is, in our opinion, unforgivable stupidity. In recent months we have had several of this type accident . . ."

AOPA'S 24-HOUR WATCH

Ever since the first announcement of its specially-designed 24-hour wrist watch about a month ago, AOPA has been receiving a brisk business in advance orders. There is every indication that AOPA's initial order from Elgin will be sold out in the near future.

The revolutionary new watch was especially designed for AOPA by Elgin. It is a true 24-hour watch, not a 12-hour dial with two circles of numbers. One revolution of the AOPA's hour hand is 24 hours.

The AOPA watch sells for $49.50 including tax. A comparable Elgin watch—but with the standard 12-hour movement—retails for about $55.

AOPA's watch is stainless steel, has 17 jewels, and is resistant to dust, water, and shock. The face is black and the numerals are radium-coated and white. The mainspring is Elgin's patented "Durapower" unit and is guaranteed for life.

HONOR SYSTEM

Here's one airport operator who firmly believes the average man is honest. His name's Ralph Jordan, and he runs Port-O-Woods airport, Bloomingdale, Ind.

Much of the time there's no attendant at the little field, which is close to Indiana's popular Turkey Run State Park. It's a small grass airport; longest runway is 2,200 feet, and there are four planes based there.

But transient pilots landing there and finding no one around, eventually walk into the field's small office in one hangar. There, prominently displayed on a blackboard, is this chalked announcement:

NOTICE TO TRANSIENTS

If you find no one here when you land, and are in need of gas or oil, help yourself. Mark down on the pad of paper on the counter how much you took. When you get home, send a check for the amount to Port-O-Woods Airpark, Bloomington, Ind. We have several grades of oil in the next room behind this blackboard. Thank you.

In addition, there is a complete supply of tools for minor repairs, gloves, maps, plotters, telephone, sofa—and even a deck of cards, according to William T. Hickman, Jr. (AOPA 68985) of Chicago, a member who recently stopped there.

The Mail Box

(Continued from page 7)

● *Recognizing aircraft from their pictures is a fascinating hobby within a hobby. Are there any other contenders for the title?*—ED.

CAN ANYONE HELP?

During the past five years you have run a number of articles concerning flying clubs, their problems and the ways that various clubs have solved them. A group of us are thinking of forming a club and would like to be in touch with some flying clubs around the country for advice. We would also like to hear from now-defunct clubs so that we can avoid the pitfalls that caused them to fold.

CHARLES D. SHANKLIN, JR.
Hopkinsville, Kentucky

A DISAGREEMENT

We read your article "A New Twist in Props" (FLYING, July) with considerable interest. We have in the past spent a great deal of time on tests of this nature. . . . It has little to do with factory testing but the studies leading to one of our reports were made to combat the frequent tendency to decide *first* what you want to prove, *then* to test in a manner to prove it. This could also be called "wishful testing" and we believe your article is subject to it.

For instance: "It's performance, on preliminary appraisal, does seem a step forward." Why? The metal prop has better take-off run, the same top speed at lower r.p.m. and therefore power.

Again: In heavy ink you compare "throttle-settings." In fact, the throttle setting has no bearing on the problem and is subject to the same type of error as comparing cruise performance at equal r.p.m., disregarding manifold pressure. There is no substitute for a combination of r.p.m. *and* manifold pressure (not throttle setting) in evaluating horsepower and therefore efficient at other than full-throttle operation.

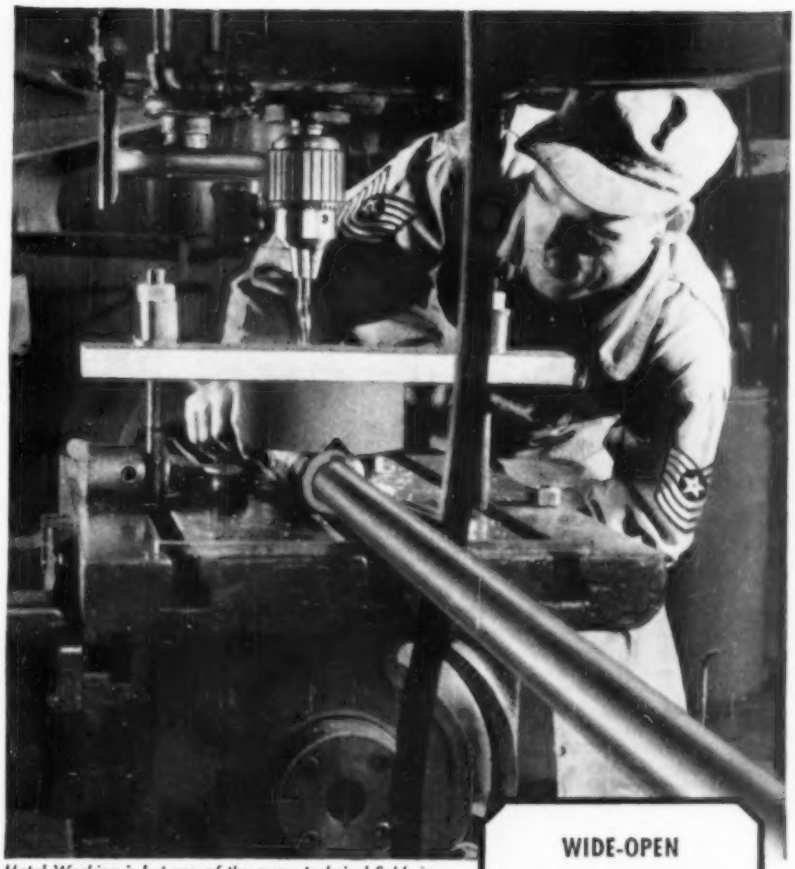
The relation of static r.p.m. to full throttle r.p.m. of the metal propeller shows better "automatic" control than the Flex-O-Prop. How does Dr. Munk explain this?

1. Performance: Metal and Flex-O-Prop show no significant difference. The wood propeller was improperly selected, since static r.p.m. is too low. 2. The Munk propeller show no appreciable "automatic" feature. 3. Vibrations: no significant difference between all three propellers. 4. Manufacturers claims 1, 2 and 5, though correct, claim nothing that any high-performance fixed-pitch propeller doesn't provide. Claim 3 is correct. but it should be pointed out that any wood propeller can claim the same. Claim 4 is misleading. Wood propellers are substantially less expensive, metal propellers only a little more.

J. C. SCHWARZENBACH
U.S. Propellers, Inc.
Pasadena, Calif.

● *Ed Hoadley feels that "Reader*

(Continued on page 64)



Metal Working is but one of the many technical fields in which the Air Force offers unusual opportunities today.

WHAT THE AIR FORCE OFFERS VETERANS

With Technical Training and Experience

If you are a veteran of any branch of the Armed Forces—with an essential technical skill—find out what the U. S. Air Force can offer you today!

Here are just four of the reasons why so many veterans with special skills have been moving into the Air Force:

FIRST, if qualified, you can enter the Air Force at your old grade or better, according to your *present ability.*

SECOND, the Air Force will tell you exactly what your initial rating and pay grade will be, *before you join up.*

THIRD, you will skip basic training, and be assigned initially to a nearby Air Force base.

FOURTH, today's fast-growing Air Force offers better pay, and more chances for rapid advancement, than ever before.

Hear the whole story. Tell the Air Force what you have to offer . . . ask the Air Force what it can offer *you.*

WIDE-OPEN OPPORTUNITIES FOR TRAINED VETERANS
in these and many other fields:

AIR TRAFFIC CONTROL
ARMAMENT
ENGINE MAINTENANCE
METAL WORKING
PHOTOMAPPING
RADAR
RADIO
ROCKET PROPULSION
WEATHER

Visit your U. S. Army and U. S. Air Force Recruiting Station today

RECRUITING U.S. ARMY U.S. AIR FORCE

U. S. AIR FORCE

LOGGING TIME

WITH HY SHERIDAN

Captain, American Airlines

A SHORT TAIL

Here is how the jet airliners will be parked at our congested stations. A jet airliner—you are the pilot, sir—will land and taxi toward the station platform. "Ground Control" will tell you over the radio, "Cleared to the gate." Then you forget; old habits are powerful. "Can't you get your tail up?" the bird in the tower cries. You puzzle over his remark for a moment, and then you come to. You are spouting fire out your rear end, of course. You are a jet. So you signal the first officer, and slowly the nose wheel comes up and slowly the nose of the plane goes down and slowly the tail goes up. When you have assumed the position of a terrier sniffing a hole or pa handing ma the pay check, then you can wheel into your gate and park, knowing that the squirt of fire behind you will go into the air.

And, gentle reader, this is not just an attempt of a columnist to think up something to say. That tail up business is what the engineers are doing right now, Lockheed and Boeing and some others.

Well, old timers, do you remember how in the old days you would be ready to take off and the instructor would cry out, "Get your tail up, you damn kiwi, get your tail up!" Now the buzzard in the tower radios, "Merry Can 229, cleared for take-off Tail down!"

What a life!

* * *

HAPPYGRAMS

There are more women in the land than have ever been landed.—Airline captain.

* * *

BROMIDE AND THE PILOT

As psychologists and a good many practical men know, the customer who asks lots of questions, many of them somewhat inane, and usually in a loud voice, is a person who has a repressed ego. His purpose is to be noticed and so to feel important. We find them among airline passengers, of course.

A woman of this type was in the airliner bound from Mexico City to Chicago and she had just about worn out the patience of the whole crew. Between the last stop, San Antonio, and the next stop, Dallas, the pilot had to go back in the cabin for a moment and he hated the thought. Sure enough the woman stopped him and inquired in a loud voice, "Oh, captain, can I get off the plane after it lands at Dallas?"

"Yes," sighed the captain. "That is the more comfortable way."

* * *

"VERY TRULY YOURS"

The problem of how to end a letter is a serious one. The trite old phrases are used over and over again, and are just about meaningless. A letter may end: ". . . and you can go plumb to hell. Cordially yours, . . ." "At the price we are asking, this property is a steal. Sincerely, . . .". Besides, most of us like to be a little original.

Well, your modest correspondent took this problem many years ago to one of our leading writers and editors and scholars. I wrote him, you see. I wrote Mr. H. L. Mencken. "What is the best way to end a letter?"

He wrote back: "At once."

* * *

SADIE THE STEWARDESS

The girls who apply for jobs as airline stewardesses are pretty thoroughly tested before they begin their training and one of the tests is a psychological one and although it is not called by that name most of the girls know what is going on. Sadie was telling some of her friends about her experience. "And then," she said, "I had my head examined."

"You did?"

"Yes, but they didn't find anything."

* * *

DEFINITIONS

Strip teasers. Small town runways. Stall Warning. Girl saying "I'm hungry."

* * *

HIGH SOCIETY

However much some of us pilots may be in need of buffing in the social art, nevertheless Airways Traffic Control has us going about in higher circles.

* * *

"The trouble with taking up golf," the doctor advised his patient, "is that too many golfers find that they have to run a business for relaxation."

* * *

MAYBE HE HAD SOMETHING

A panting young man was shown into a patent attorney's office and he said, "I want to get me a patent. I've just invented the world's safest airplane. No one will ever get hurt in *my* airplane."

"Just what property does your airplane have," the patent attorney asked, "that leads you to say that?"

"Oh," said the inventor, "it won't fly."

* * *

The thing that I don't like about preachers is that they are always threatening us with life after death.

* * *

EPITAPH

Fast are the wings that carry men,
Slow are the minds that fly them,
And short are the lives that nary ken
The devil afore he spies them.

Time Is Running Out

(*Continued from page* 15)

scarce materials."

Like Mr. Lovett, Mr. McCone sees that difficulty increasing instead of diminishing as the rearming of the United States progresses.

Already the time required to assemble materials is consuming 12 to 14 months of the 18 months lead time for fighters, and 24 months for bombers, he said. How can it be shortened? Here's his opinion:

"I am certain that, with an effective materials control program, we can shorten to six months the time required to assemble materials. Primarily, the reinstitution of the CMP, or whatever name you give it, will not by itself clear the way for an orderly inflow of materials into the air program. The point should be driven home that if we are to create airpower on the scale that the crisis demands the American economy from this point on must submit itself to a coherent and rational system of controls."

Under present planning, which accepts as one of its basic problems the lead times necessary in all phases of the industry, the 95-wing air force will be in being by June of 1952, but it will not be completely equipped until a year later.

Mr. McCone proposed about a year ago that the industry prepare for greater production by building our capacity to roughly double production now scheduled. His proposal was accepted and embodies in President Truman's December, 1950, message in which he said the industry should be prepared to produce 50,000 airplanes a year.

The Undersecretary explained that here is no need to actually purchase planes coincidentally with providing facilities, because "under the frustrating influence and control of lead time, production can not be accelerated more rapidly than had been planned."

He saw the institution of the controlled materials plan, which became effective July 1, as making it possible for us to produce vastly increased quantities of airplanes over and above the schedules laid down for 1952 and 1953—and thereafter.

"We, therefore, reject the cliche so often heard that 96 wings is all we can get," Mr. McCone declared. But he added that he foresees fewer automobiles, refrigerators, houses and luxuries for the American public.

"We cannot have 'butter,' as we have enjoyed it in 1948, 1949 and 1950, *and* "guns" as we must have them in 1951, 1952 and 1953," he said. "Ultimately we can, I believe, because increases in the production of basic materials and an increase in the labor force and productivity of workers will make both butter and guns possible. But today we cannot expect to have both and, since our menace is today, and not in some comfortable future year, action today is required."

END

"AOPA IS GREAT FOR PRIVATE PILOTS"

"AOPA is great for private pilots. I don't understand how anyone can stay out of your ranks. I am extremely proud of my eleven-year membership and low number, 3682. The map service is really terrific and Max Karant's Newsletter is the most important aviation publication in the country today."

"CLARK DENNIS, Singing star of radio, records and television"

Says veteran member

CLARK DENNIS

Don't put off your membership to AOPA. Have the sense of security which belonging to this great organization gives you. Know that whenever and wherever you need help, AOPA is standing by—to fight for your cause and that of *all* of the thousands of private flyers all over the country. AOPA removes the kinks and makes flying a pleasure—gives you innumerable benefits, including the AOPA Washington Newsletter, which keeps you informed of the very latest happenings in the aviation world. And AOPA's map service eliminates the present-day dangerous practice of navigating aircraft with obsolete charts. This exclusive service provides AOPA pilots with the latest charts—in any quantity—as quickly as they are needed. Your $5.00 membership fee means all this and much more. Don't wait. Join today!

USE THIS MEMBERSHIP BLANK TODAY!

Valuable AOPA Services FREE to Members

The Washington staff of AOPA will help you in personal flying problems, licenses, regulations, legal tangles, documents, plane sales and purchases. Also national AOPA-Hertz Driv-Ur-Self courtesy card; AOPA Washington Newsletter; each month the special AOPA edition of FLYING magazine; TWA-AOPA courtesy card assuring service and maintenance facilities at most TWA airports, advantageous aviation insurance service; distinctive AOPA pilot's wings, emblems for your plane and car, and membership card. Above all else, AOPA continuously protects and fights for your flying interests in government and other circles.

AIRCRAFT OWNERS AND PILOTS ASSOCIATION
National Headquarters, Dept. F-9-51
Washington Bldg., 15th and N.Y. Avenue, N.W.
Washington 5, D. C.

I first soloed an airplane at .....in the year.....

I own aircraft NC.....Make.....
I hereby apply for membership in AOPA

I was previously an AOPA member.....

My registration number was.....

Enclosed find check or money order for.....
(U. S. A., Canada, Mexico, Central & South America, $5.00.
All other Foreign, $6.00.)

NAME.....
Please Print

ADDRESS.....

CITY & STATE.....

PILOT LICENSE NUMBER.....

SIGNATURE.....

$1.80 of each year's dues are for my subscription to the AOPA Edition of FLYING.

"AOPA"
AIRCRAFT OWNERS AND PILOTS ASSOCIATION

CIVIL AIR PATROL

WING TALK

Finletter Backs CAP

CHIEF TOPIC for discussion following the CAP Wing Commanders Conference held at Colorado Springs' Broadmoor Hotel in June has been the surprise visit paid by Air Force Secretary Finletter. Although he didn't stay long or have too much to say, CAP leaders feel that Mr. Finletter's presence definitely meant better days ahead for the Civil Air Patrol. It is well known that many of CAP's top commanders have felt that the Air Force has not been as enthusiastic in supporting its official auxiliary as it might have been. Wth CAP taking the lead in sponsoring Civil Defense projects, they feel that increased support is not only necessary, but deserved.

Prior to his flying visit to the Colorado meeting, Mr. Finletter had stated that the objectives of the Civil Air Patrol were "sufficiently sound to justify continuing assistance," and that their mission was "vital to the Air Force and warrants increased support."

PIO Appointment

A PROMINENT Washington, D. C. public relations official has been appointed Public Information Officer of CAP's National Capital Wing, with the rank of

Major. He is Edward E. Slattery, Jr., chief public information man for the Civil Aeronautics Board. Slattery, who flies his own plane, has been an aviation journalist since his 1930 days with the Boston Transcript.

Pennsylvania AFA Resolution

ONE OF THE REASONS for that big jump in CAP membership recently can be traced directly to the Pennsylvania state convention of the Air Force Association. Prodded by AFAer Herbert R. Frye, the Keystone state AFA members passed a resolution whereby all would join the Civil Air Patrol.

Frye, who is also a staff member of Colonel Phillip F. Neuweiler's Pennsylvania CAP Wing, recommended that:

. . . AFA membership could best serve the interests of the Air Force through CAP membership

. . . Their interest in serving Civil Defense in time of emergency could best be served through CAP work

. . . AFA members on Reserve military status could be utilized as instructors in CAP units.

Pan Aids Spotter

A TELLTALE bit of reflected sunlight glittering on the mess sergeant's frying pan proved to be the undoing of two companies of Maryland National Guardsmen while on an air detection problem recently. The Guardsmen were well holed up in a wooded sector near Silver Springs and CAP reconnaissance flights were about to throw in the towel. Then CAP flyer, Lt. Harold T. Hawkins spotted the glitter of the kitchenware and the campsight was discovered.

Maryland Wing Lauded

FLYING this month congratulates Colonel Bennett Crain's Maryland Wing, who turned out 500 strong for a recent simulated search and rescue mission staged in cooperation with USAF's 5th Air Rescue Squadron. More than 50 Wing planes took part in the mission. The "missing" aircraft was located in just one hour, and a land rescue party reached the scene of the "crash" less than 15 minutes later.

JC Clubs Help

CAP'S CADET program has a brand new booster. It's the U. S. Junior Chamber of Commerce, whose Aviation Chairman, Leonard E. Thayer, has announced a move within the national organization to promote the program through the Junior Chamber's 1,800 JC clubs.

Thayer is a CAP man himself and is PIO of the Ellensburg, Washington squadron. He has urged all Jaycees to lend a helping hand to CAP units and has invited CAP staffs to call upon the JC group for assistance whenever they need it.

"This is no time to promote cowboy antics," Thayer has told Jaycee groups, "but to instill in youth that aviation is important in the world today."

New Communications Head

LIEUT. COL. WALTER G. WILSON, recently assigned to National Headquarters, Civil Air Patrol, at Bolling AF Base as Director of Communications, is shown with one of the radio stations under his supervision. Although there are more than 7,000 such stations now linked to CAP Headquarters, the Colonel states one of his main aims in his new capacity is to extend the network program even further. Colonel Wilson has the distinction of serving with the first Flying Fortresses in 1937 as well as the first radar-operated patrol planes early in 1942. Before coming to Bolling, Colonel Wilson attended the Air Command and Staff School and the Electronics Staff Course at the Air University.

Test Alaska Defenses

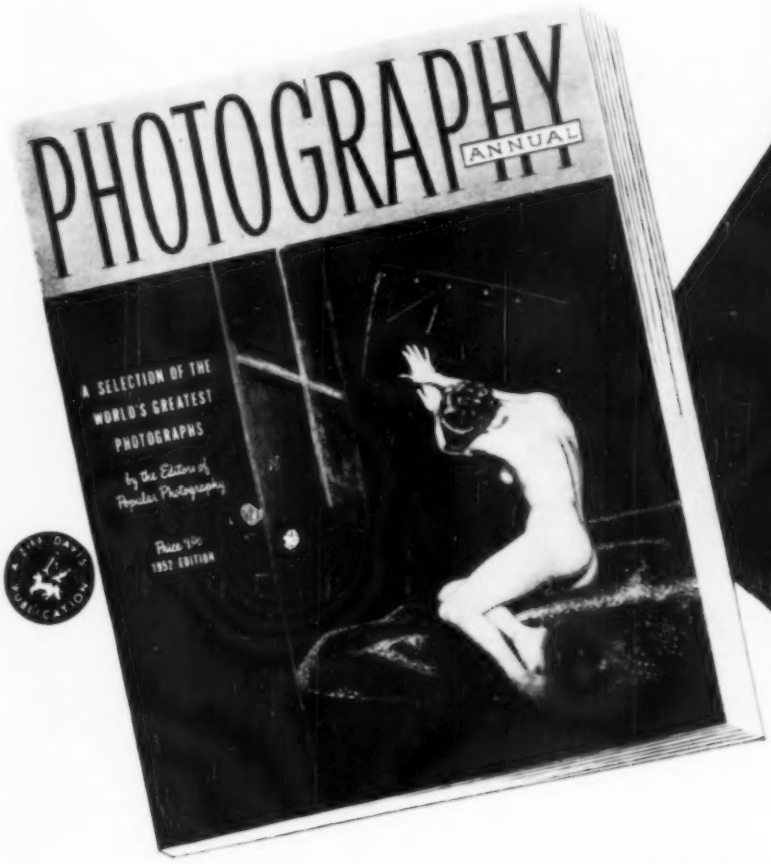
ALASKA WING'S Anchorage squadron took an active part in Operation Firestep, a joint military and civil defense problem to test Alaska's ground and air defenses. The CAP group not only flew artillery fire control missions but actually manned an outpost within 100 yards of the Aggressor Force's regimental headquarters. These observers were resupplied with radio and mess facilities for one day and entire outpost personnel was changed on the third day. Aggressor troop movements were observed and information was relayed to Ground Defense Headquarters via CAP radio facilities.

Legal Counsellor

A FORMER Assistant Attorney General of the United States, Roy St. Lewis, of Washington, D. C., has been appointed as legal counsellor to CAP's National Headquarters. The position carries the rank of Colonel, CAP.

UNIVERSITY OF MICHIGAN LIBRARIES

BIGGER, EVEN BETTER THAN THE '51 EDITION!



Your New PHOTOGRAPHY ANNUAL

COMING AUGUST 24!

- *Beautiful Long Lasting Cover*
- *Special Color Features!*
- *Outstanding Photos!*
- *Top-notch Articles!*

*284 Pages Loaded With **NEW** Techniques On*

- THE CAMERA
- THE FAST SHUTTER
- THE SLOW SHUTTER
- THE LARGE APERTURE
- THE SMALL APERTURE
- FOCUSING
- DARKROOM MAGIC
- PRINT TONING
- STORY-TELLING PICTURES
- PHOTO PROBLEMS
- FILTER EFFECTS
- ANGLES—HIGH AND LOW
- PUTTING THE SUN TO WORK
- PICTURES AFTER DARK
- THE CAMERA INDOORS
- LIGHTING THE PICTURE
- FLASH PHOTOGRAPHY
- TRICKS AND EFFECTS
- THE VERSATILE LENS
- THE FILM

Concise! Simple! Every technique discussed brilliantly clarified by photographic examples. Over 200 Photos!—Gorgeous Color! Exquisite Gravure!

PHOTOGRAPHY ANNUAL—1952 Edition—the year's best photography value!

IDEAL AS GIFTS!
RESERVE YOUR COPIES NOW!
At Your Newsdealer—Camera Store—Bookshop

Publishers also of: POPULAR PHOTOGRAPHY • FLYING • RADIO & TELEVISION NEWS • RADIO-ELECTRONIC ENGINEERING EDITION OF RADIO & TELEVISION NEWS • MODERN BRIDE • FICTION GROUP • ZIFF-DAVIS COMICS

ZIFF-DAVIS PUBLISHING COMPANY—185 NORTH WABASH AVENUE, CHICAGO 1, ILLINOIS

NOTES ON CIVIL FLYING

Lightplanes and the CMP

Although the small-plane manufacturer has high-echelon recognition as part of the national defense program, the Air Coordinating Committee has cut 1951 aircraft production to 2,500 planes. And the Defense Production Administration has decreased materials needed for that number of planes by 20 per cent. The reduction in materials allocations may not be as drastic as it now seems, however. Reasons: Materials allocations are in pounds, not in numbers of planes, and substitute materials may be used for some items. There is a possibility, too, that manufacturers will be able to use materials on hand in the third quarter of '51, in addition to materials allocated.

AIA Warning

Joseph T. Geuting, Jr., manager of AIA's personal aircraft council, declared in a Wings club address that "restrictions on private flying or curtailment of light civil aircraft may have serious effects on military production, on economy-supporting business and agriculture, on fixed-base operations, and on the nation's disaster relief potential." By continuing manufacture of current civil type aircraft, he said, the light plane industry can maintain a mobilization potential for war of a value which should not be overlooked.

Avigator, Junior

Mitchell Industries announces a new "Avigator, Jr." priced at $307.21, including tax. Omni and installation kit are extra. The set is designed for fliers who require only VHF and who may have low frequency radio installed. It has a six-

channel VHF transmitter, with two standard crystals—one for 122.1 range stations, the other for 122.5 towers. Unicon (122.8) or other frequencies can be added without removing set from plane. Both low frequency and VHF sets can operate off twofold antenna. Avigator, Jr. weight without omni is 10 lbs. 5 oz.; with omni it is 22 lbs. 11 oz.

The L-2 Autopilot

Lear, Inc., is offering private pilots a handsome booklet which describes in text, photographs and drawings exactly how the L-2 Autopilot functions. The booklet takes the reader on an actual L-2 flight, telling him in simple language what to do and when to do it. Copies of the booklet may be obtained by writing Norman Warren, 11916 W. Pico Blvd., Los Angeles.

In Lieu of Rent

Here's a tip for communities which may some day want to establish a seaplane base when money to finance it is tight. After Detroit paid for grading land and building a road to its new Seaplane base, improvements cost the city absolutely nothing. The Great Lakes Seaplane Association asked for and got enough donations of money, material and labor to build a concrete ramp and a concrete parking space. Then, the Detroit Aviation Commission decided to accept improvements to the property and facilities in lieu of rent. Improvements resulting from that plan have far exceeded any which rentals would have financed in the same period. There is a master plan for improvements.

Two New FAI Records

Mrs. Ana Louisa Branger's recent light plane altitude flight (27,152 ft.) has been accepted by Federation Aeronautique Internationale as a world record for landplanes weighing less than 1,100 lbs. fully loaded. Her plane was a Piper Super Cub with a Lycoming 125 h.p. engine. FAI also announced as a world record for piston-engine aircraft Jacqueline Cochran's speed of 464.374 m.p.h. in a Merlin-powered F-51.

Convair Wing Fixture

The largest wing fixture ever built by Consolidated Vultee is being used to assemble wings for the Convair 340. It is 115 feet long, weighs 50,000 lbs. Convair wings are assembled in one section, instead of three, to save weight. First flight of the 44-passenger 340 is scheduled for fall.

Approach-Landing Charts

Rear Adm. R. F. A. Stubbs, Coast and Geodetic Survey director, has issued the first nine of a series of instrument approach and landing charts. They show standard instrument approach procedures on omni directional (VOR) landing aids, and were designed for approaches and landings at fields with very high frequency omnirange facilities. Scale is about four miles to the inch.

New PAC Division

A new division for general overhaul and maintenance of commercial aircraft has been established at Pacific Airmotive

corporation's Burbank, Calif., plant. Chester Keasling is its manager. The division offers complete service for airplane and engine maintenance and overhaul to private and commercial aircraft users.

Aerocar Model II

Model II version of Mott Taylor's Aerocar has undergone extensive modification. Among new specifications are: Wing span, 32 ft.; wing area, 180 sq. ft.; wing loading, 10 lbs. per sq. ft.; trailer length, 14 ft.; car-trailer length, 25 ft.; maximum road h.p., 40. Among new performance figures are: Landing speed with flaps, 50 m.p.h.; designed road speed, 60 m.p.h. The Aerocar and the Fulton Airphibian are being evaluated at Fort Bragg, N. C.

TV Up in the Air

First attempt to receive television aboard a trans-Pacific airliner recently succeeded on United Air Line's Flight 29 outbound from San Francisco. Technicians of United and KRON-TV conducted the experiment. A 3-year-old RCA 10-inch set was used. Reception at 20,000 ft. was excellent for 250 miles west of San Francisco. It faded out at 306 miles.

Circular 'Copter Routes

Petroleum Bell Helicopter, Inc., has filed application with CAB for six circular helicopter routes in the New Orleans vicinity. They will operate from the roof of the Humble Oil & Refining company building now under construction at Jefferson Davis parkway. Charter flights to points on the proposed circular routes will be made pending approval of the application.

Airborne Missionary

(*Continued from page 29*)

traveling natives. Reverend Spotty, therefore, could not depend on these as accurate guides. He became explorer as well as disciple.

From the air, he could scout the island and locate villages and inhabited areas with less risk and time involved. He then could map out a walking route to the locale, since his first trips were on foot.

Reverend Spotty's first plane was an Army Surplus L-4, which he acquired six months after settling in Tuguegarao. This was kept in flying condition for about a year. This was a job for several hundred reasons—each reason being a native who had never seen a plane on the ground. A constant vigil had to be kept to keep them from ripping off the fabric or stealing the propeller.

The plane was destroyed, however, when, in attempting to land at one of his make-shift airports, the Reverend flew into the side of a mountain.

Within a few months, he bought another plane—an L-5. He called it "The Circuit Rider" and within the next three years he made dozens of trips all over the island.

The second crash occurred during a take-off from a rocky riverbank landing strip at Palanan. The missionary pulled off three feet of the wing and was "stuck" in the village 13 days before he was rescued. Palanan was also the scene of his third crash the following year.

He was taking in a last load of medical supplies when a severe downdraft of cold air over the mountain slammed his heavily-loaded plane right into the river. He escaped this one, too, without a single scratch but it brought an end to the L-5's flights.

It was this crash which gave the missionary his very favorite yarn. When he took off from Tuguegarao, loaded with food and medical supplies, he was not warned about an approaching typhoon. The airport operator became worried as the Reverend disappeared into the blackening clouds and finally called the local news service to report that Reverend Spotty was lost somewhere in the jungle.

Within hours after the storm had blown itself out, Air Force planes were searching for signs of a crashed plane. After two weeks, they were at the point of abandoning the hunt.

All this time, the missionary was safely and casually completing his work in Palanan. He had come safely through the storm, until the mishap at landing. Realizing the plane would not fly again, he was making plans to walk out.

On the 18th day, he noticed a large USAF plane circling the area. Not realizing he was the object of the plane's low-flying maneuvers, he paid scant attention to it. Before he had finished shaving the next morning, he heard the familiar hum of an L-5 engine and two lightplanes skimmed into view.

After they had landed, Reverend Spotty sauntered out to greet the arrivals. It was only after identifying himself to the two pilots, Capt. H. Parker of Clark Field and Leland Archer, civilian pilot, that he learned of his being "lost."

"Actually, if that airport operator had not sent the message he did, there would probably be at least one of us still in Palanan," he recalled. "Just a few days before my 'rescue,' one of the men in the party had taken seriously ill. He could never have walked out and was badly in need of medical attention."

Reverend Spotty hangared his planes at Tuguegarao and had very few maintenance problems. He himself took care of minor knocks, having studied engineering before becoming a Minister. Since he knew something about engines, he found simple mechanics easy to attend. But for major overhauls and 25-hour checks, he took his planes to International Airport in Manila.

Getting gas and oil was not a real problem, either. He bought these supplies in Manila and they were shipped to Tuguegarao by truck. The boys in the 13th Air Force stationed at Clark Field helped on finances through their chapel.

For one full year, mechanics at the base, in addition to financing supplies, volunteered their time and services to keep the missionary's plane in constant good working order.

"Without the very fine cooperation of the boys at Clark," states Reverend Spotty, "many of our medical and mercy flights would have been impossible." END

COMING!
OCTOBER 9th

The Aviation Event of the Year!

U.S. NAVAL AVIATION ISSUE!

FLYING

Note
THIS GREAT SPECIAL ISSUE OF FLYING will be Premium-Priced at Newsstands
★
SUBSCRIBE TO FLYING
Get your copy at no extra cost as part of your subscription
★
USE ORDER CARD IN THIS ISSUE

Hunter-Killer

(Continued from page 21)

reports without my asking. "No contacts on radar as yet, sir."

The Guppy gives me the range and tells me to return if the contact is not a sub. We have been out two hours. My gas check shows enough for two more. If we are kept here, a fresh team may relieve us.

"Radar contact, dead ahead," reports Barker. He calls the range and I calculate rapidly. Seconds to go. "Contact has disappeared, sir!"

I curse mildly and circle to lay my sonobuoy pattern. Barker leaves the radar for the sonobuoy receiver.

"What do you hear, Barker?" I ask.

"Definite indications of a sub on numbers one and two."

I switch my receiver from "radio" to "sono" and listen. It's a sub, all right. I report this and the Guppy relays it to the ship. Then he calls me:

"411, this is 408. SNARL is sending a relief team and two wreckers. Remain at contact until relieved, then join me over SNARL."

The fresh team will have more sonobuoys and gas than we have. The wreckers are destroyers. I keep tracking the sub, waiting for my relief. If SNARL'S course is the same now as at launching time, I can return in fifteen minutes. The Guppy can guide me.

But he said, "Join me over SNARL." Why? He should have picked me up before going back to the ship. Oh, well. I know where the ship is . . .

I drop a float light to re-mark the pattern. Propeller noises continue strong on sonobuoys as I listen, switching periodically back to radio. At 0355 the relief team arrives and my job is done. Now to get home.

I set a course for the ship. To be sure of it, I turn on my homing signal receiver. I hear nothing. The receiver is dead. I'm not worried but, when Barker reports no contacts ahead, I ask the Guppy for his position.

"I am circling SNARL," he replies. "Do you see me?"

Before I can answer, Barker has a contact and a white light crosses our nose. I ask the Guppy to blink his lights. The light begins to blink.

He is turning right—strange—planes circling the ship make left turns. Going pretty fast, too. What's wrong? It takes some time to get close enough to find out I've been chasing a PBY—a big patrol seaplane! We are not on his frequency—why did he blink when I asked the Guppy to blink? I break away and call the ship. They should have me on radar.

Not SNARL, but the Guppy comes back, "Didn't you get the word, 411? SNARL was torpedoed. Umpires put her out of action for thirty minutes."

Thirty minutes! I must have missed this activity while listening to sonobuoys. Another sub had penetrated the screen and "sunk" my carrier! Rules call for the ship to stay off the air until the out of action time expires.

"What time was she sunk?" I ask the Guppy. "At 0357."

SNARL can transmit to a lost plane—but am I lost? Half an hour from 0357 was 0427. It is now 0415. My fuel will last till 0500. I call the Guppy again:

"408, I do not see you. Give me SNARL's position, course, and speed."

From his answer I deduce what has happened. The torpedo attack had occurred shortly after SNARL launched the relief team. Changing course to avoid the attack, the ship had stayed on the new course. I had missed the change-broadcast, no doubt, while I listened to sonobuoys.

How far have I chased that PBY? I hadn't timed it, thinking I was over the ship. I ask the Guppy for a vector. No reply. I have flown beyond VHF range. Now what? I can use up more gas to climb and increase my radio range, or I can estimate my position and set a probable course for the ship. I decide to do both.

* * * * * * * * * * * * * * *

"What prospect is there that the airplane will have any considerable commercial value? . . . My own answer to these questions is that the airplane is capable of such development that it will carry passengers, mail and express freight with great speed (100 to 150 miles per hour) and comparative safety greater than that of train and steamer over long distances (the Atlantic Ocean)." — James V. Martin, Air Scout, April, 1911.

* * *

"The machines will eventually be fast, they will be used in sports, but they are not to be thought of as commercial carriers. To say nothing of the danger, the sizes must remain small and the passengers few . . . the power required will always be great . . . hence fuel cannot be carried for long single journeys. The North Pole and the interior of the Sahara will preserve their secrets a while longer." — Octave Chanute, Popular Science, March, 1904.

* * * * * * * * * * * * * * *

I wonder about Barker in the back seat. A crewman in the Pacific War, he knows when his pilot is lost. Compared to the hours in his log book, my total flight time is insignificant. What is he thinking? Will he keep his head if we ditch? Will I keep mine?

I try to sound cheerful with, "The ship must be ahead somewhere, Barker. See if you can pick her up."

"Aye, aye, sir." He sounds cheerful. Now I am worried! But suddenly: "I have a target—two targets—twenty degrees port, eight miles."

The ship and her plane guard destroyer! I swing left and let down as we approach. I see the phosphorescent wake of the carrier. As we sweep over the "carrier", I bite my tongue. It is a destroyer! Beside it is another.

All right, let's face it, I tell myself. You're lost! Better stick around these tincans so they can fish you out when you ditch.

I think of the 38-degree water below, and I wish like hell I could call those tincans.

The distress frequency! That was the answer! As I reach for the radio button a light blinks ahead. That PBY again! No—something bigger. A blimp, this time! We didn't expect gas bags out here. Picking up the mike to report my find, I remember the ship is off the air. But the clock said 0431. Out of action time was up four minutes ago. I call SNARL.

Almost immediately comes, "This is SNARL, back in action. What is your position, 411?"

"I am circling a blimp. Two destroyers in area."

A pause, then "411, did you say, 'A blimp'?"

"That is affirmative."

"This is SNARL. Wait."

Charts and operation orders are being broken out and consulted. SNARL is startled, too.

"411, you are near the Supply Train. Head one-four-zero for SNARL."

"I think we're O. K. now, Barker. We just got a heading for home."

At 0450 we are over the ship and at 0454 we land, with thirty gallons of gas.

I clump stiffly to the ready room. Barker is in a rear seat, talking with the standby aircrewmen. I wonder what he is telling them. In the front of the room, pilots are being briefed. Overhead, tractors rumble, respotting their planes for the next launch.

I bum a cigarette from my Guppy pilot, who had landed first. He said he had told me to join him over the ship because his engine was acting up and he wanted to be there if it quit. Naturally, he didn't know I had missed the course change transmission.

Barker leaves, probably to hit the sack. I drop into his vacant chair. One of the crewmen speaks to me, his voice friendly:

"Nice work, Mr. Cornelius."

"What do you mean?" I ask, surprised.

"Barker said you nailed down a sub."

"Is that all he said?"

"Yes, sir. Anything else happen?"

"No," I said uncertainly, "I guess not."

"Sure gotta hand it to that Barker," the aircrewman went on. "You know he's had to ditch seven times?"

"Seven times?"

"Five in the Pacific, two in the Atlantic. He was twelve days in a life raft once. And he's still flyin'!"

My cigarette burns me, and I stub it out. I remember the calm voice saying, "Permission to turn on the radar, sir?"

I get up. Threading through people crowding out, I reach the duty officer's desk to fill out my flight report. On the blackboard is chalked the position of our sonobuoy pattern. Beside it hangs a radio dispatch sheet. The message reads as follows:

"SUBMARINE ABLE RULED SUNK X WELL DONE ALL HANDS X IF WE CAN GET THESE GUYS THE COMMIES WILL BE A CINCH".

It was signed by the admiral in command. I suddenly realize I am very tired, but it isn't a bad feeling. END

Rawdon, T-1

(*Continued from page 27*)

RAWDON, T-1
(Type Certificate 794)

Engine, Lycoming 0-290-C	125 h.p.
Wingspan	33 ft. 4 in.
Length	24 ft. 2 in.
Height	7 ft. 3 in.
Empty weight	1,200 lbs.
Gross weight	1,800 lbs.
Restricted gross weight (sprayer)	2,110 lbs.
Wing area	165 sq. ft.
Top speed (sea level)	135 m.p.h.
Cruising speed	120 m.p.h.
Stalling speed	49 m.p.h.
Rate of climb (at gr. wgt.)	840 f.p.m.
Takeoff (gr. wgt., zero wind)	467 ft.
Landing run (gr. wgt., zero wind)	359 ft.
Wing loading	11 lbs.
Power loading	14.4 lbs.
Range	415 miles
Fuel capacity	29 gal.
Service ceiling (gr. wgt.)	17,500
Baggage (gr. wgt.)	40 lbs.
Price:	
As trainer (T-1)	$5,785
As sprayer (T-1CS)	$6,195

Source:—Rawdon Brothers Aircraft Corporation, Wichita, Kan.

want to wheel the elevator trim wheel, so I had to be content with the heavy back pressure necessary on the stick. I noticed in gliding that the airplane would pick up excess speed unless I continued this back pressure. Of course, understanding that the plane is trimmed for cruise.

I entered traffic correctly, to the right this time. Even with 800 feet altitude I undershot. That Kansas wind was in "calm" condition at 30 m.p.h. A moderately heavy pressure is required on the stick to ease it up into stalled position. There is a quick flare-out from 70, then you are bouncing on the ground. There is no fear of ground-loop, because of the extremely wide landing gear.

Instead of working the mechanics needlessly on the conversion to a sprayer aircraft, we picked up a twin of our check-ship ready for delivery as a sprayer. It is a single-place plane and I wanted to see what it would do under 75 gallons of spray material at 7.5 pounds per gallon and full tanks of gasoline (useful load of 900 pounds). After the spray tanks were filled this airplane had to be hand-propped, battery and generator having been removed. I propped it and stepped aside to watch a simulated spray operation.

Jack was interested in one thing only—to show how the Rawdon would spray a field. He dug in down-wind, altitude five feet, the plane leveled, and a shower-bath spray covered the runway from 10 nozzles. It was like an advertising "smoke" ship working down-wind. The heavy chemical vapor drifted down in the wake of the plane.

He made four simulated passes at the field, then snapped the stick back into a fast climb to 200 feet. I noticed that under spray loads the airplane was not quite as agile. The last run was a floating slow flight at some 55 m.p.h. indicated. I subtracted the wind and estimated not over 20 m.p.h. ground speed. I could have run along beside him. His landing was without flaps and he did not roll over 200 feet.

We went back to the conventional trainer, to measure some distances. The official CAA figure was 467 feet for take-off at gross weight. This time we checked it solo with approximately 20 gallons of gas and no baggage. The tape measured 259 feet from standing start. This was against a weather station surface wind of 21 m.p.h. and field elevation of 1,400 feet. No flaps were used for take-off.

From standing start we pitted the Rawdon against a stop-watch. Sixty seconds brought the aircraft up to 945 feet. Then from level flight at 1,000 feet, the clock was punched again for sixty seconds. It climbed to 2,080 feet in that time.

The landing run, with 30° flaps and full brakes on a muddy field, took exactly 154 feet. This was in contrast to the published figure of 359 feet. Inasmuch as she rared up a little, I do not recommend this short landing for general practice. During all the flights, I was impressed with the visibility as much as anything. You could see all around the compass, and in the front seat you can see down on either side. The rear seat rides lower on taxiing, and an instructor would have the same visibility problems he had in the various primary trainers of War II.

(*Continued on next page*)

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

Back in the days when one of the now-large commercial airlines was trying to get started, one of their stunts was to give short courtesy rides in tri-motored Fords.

The project grew pretty monotonous for old-timer pilots Joe and Gus, until the day they figured out a way to liven things up.

Joe took off with the crew chief acting as co-pilot. Gus, dressed in an old pair of overalls, sat back with the passengers, pretending awe at his first flight.

After Joe had climbed up and leveled off, he walked back through the cabin and stopped at Gus's seat.

Gus stammered, "Gee, these here flying machines are sure exciting."

"Want to fly her a while?"

"Ain't never done that before."

"Nothing to it, Gus. Here, take this book which says, 'How to Fly' and go ahead. I'll sit back here and chin with the folks." With this, Gus took the book and waddled up front, while Joe plunked himself down with the startled passengers.

Gus left the door wide open so the passengers could see everything that went on in the cockpit. First he yanked the wheel one way, then he let go and grabbed the book—thumbing wildly through the pages. He read a bit, scratched his head, then grabbed the wheel and tried again.

The plane banked and went into a dive. Next it zoomed into a climb.

Finally it came careening in on the final approach. At this point, Joe, feigning sleep, slumped down in Gus's seat, and closed his eyes.

Just before the plane crashed, Gus—still wildly referring to the book—pulled her out gently and greased her on the runway.

Strangely enough, their passengers seemed thoroughly convinced that aviation was here to stay.

—*Russ Walton*

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

Northrop
TRAINING
gives you the "edge"

Aeronautical Engineering
Aircraft & Engine Mechanics

In *your* aviation career you want the "edge" that helps get promotions—helps bring *success faster*. NORTHROP training helps you qualify for a *profitable, permanent* and *interesting* future—gives the "edge" to your aviation career. *NORTHROP* graduates are backed by the *prestige of a name famous* throughout aviation. NORTHROP training can be your *passport to opportunity* and success.

NORTHROP *Training is Outstanding*

Skilled NORTHROP instructors give you up-to-the-minute training in the *rapidly advancing science* of aviation. You learn *thoroughly* in the minimum of time. You use the *newest training aids—like jet engines, wind tunnel, single and multi-engine aircraft, laboratory and shop equipment of all kinds.*

MILITARY ADVANTAGES

In civilian *or* military life, *Northrop* training counts. For example, NAI engineering graduates are qualified educationally to become Air Force or Naval Aviation Cadets, or Officer Candidates. Regardless of your present status, write today for complete information.

Northrop
Aeronautical Institute
1519 East Broadway, Hawthorne
Los Angeles County, Calif.
Approved for veterans!

SEND FOR FREE ILLUSTRATED CATALOG
Gives details of instruction—shows pictures of training equipment you will use

NORTHROP AERONAUTICAL INSTITUTE
1519 E. Broadway, Hawthorne, Los Angeles County, Cal.
Please send me immediately the Northrop catalog, special military information and employment data, and schedule of starting dates of classes. I am interested in:
☐ Aeronautical Engineering ☐ Aircraft & Engine Mechanics

Name _____ Age ____
Address _____
City _____ Zone ___ State _____
Check one: ☐ Veteran ☐ Non-Veteran 6

The Rawdon is a low-wing monoplane, two-place trainer and pleasure craft. The wings are semi-cantilever with six external diagonally streamlined trusses These trusses tie into a steel tubular fuselage. The vertical tail plane is internally braced, with the stabilizer tied to the bottom of the fuselage with two additional streamlined struts. The whole airplane is covered with grade "A" fabric, closely rib-stitched, and finished with 17 coats of nitrate dope.

The fuselage is a welded steel type, Warren-trussed, with a welded framework separating front and rear seats. It is designed for a 145 h.p. engine. Across the top is a "turn-over" bar of $2^1/_4$" heat-treated steel. It anchors to the external struts, and to the frame-work between the seats. Between the frame-work and the $2^1/_4$" bar, a spray tank would have a pretty hard time coming forward. Four Gs inverted has been recorded on this assembly.

The canopy is a Rawdon invention, as is the landing gear. This was the model sold to some 800 users of hatches on the surplus PT 19s and 23s. Tinted Lucite by duPont is used in this canopy, and it contains properties which guarantee you will not be sun-burned while under it. To thinly-thatched Thomases like myself, this is a blessing.

A feature of this airplane is the novel way in which it secures adequate engine cooling. The very small air intakes in the nose seem quite inadequate. Such is not the case. The Rawdons have cut their exhaust stacks just below the firewall and inside the cowl. A stainless steel protective housing guides the exhaust gases to the free air. As the gas blows out and down it sucks engine air around the engine, and creates forced air cooling around the cylinders. The idea is called an "ejector exhaust cooling system."

A Gottingen high-lift (398) airfoil has been utilized, with Rawdon modifications. This provides fine lift effect, and the modifications have resulted in good cruising characteristics. Thickness ratio runs 13.8 per cent. Each control surface is statically balanced. This was done by projecting covered tubes forward from each end of the elevators. The ailerons are internally balanced. All this explains the placard speed of 180 m.p.h., but does not explain Jack's recordings of 220 m.p.h.

The spray unit assembly is another Rawdon design and manufacture. It consists of a large 75-gallon (new ones are 80) tank, a turbine pump, regulators, tubular manifolding, and provision for as high as 18 spray nozzles. Ten is the minimum and the number on the airplane I inspected.

Conversion of the T-1 trainer into the T-1CS sprayer in four hours is as follows: (1) remove rear seat; (2) install tank in rear cockpit; (3) remove generator and battery, installing turbine pump in the generator's place; (4) install control valve and pressure gauge in front cockpit; (5) connect plumbing through the firewall (which comes drilled), and to the wing manifolds (yes, the standard T-1 has the stainless steel manifolds all built in); (6) install as many nozzles as desired in front of rear spar (just screw them into the hidden manifolding), and (7) s-p-r-a-y.

The nozzles are known as "flooding" nozzles, making a flat fan spray that is perpendicular to the slip-stream. Wider coverage is gained by this arrangement. Contained in the nozzle is a 10-pound diaphragm check valve which automatically stops leakage of chemical when not in use.

The typical formula for spraying in Kansas is a gallon per acre. This means the T-1CS could spray a 75 acre field in 15 minutes. I would like to have a contract to spray all of Kansas at current spray rates.

As to the items that might be remedied, I didn't like the noise in the trainer I flew. My floor-boards were practically the exhaust stack extensions and that puts the exhaust noise right into your ears. Rawdon has gained so much in its new cooling system that in training this could be considered a minor item. The sprayer has been sound-proofed to some extent, but could stand more.

The wheel that winds and winds to control elevator trim is awkward and has too low a gear ratio. I gave up trying to use it. The latest models have in them a small lever-type control next to the throttle lever, and this is a distinct improvement. The seats are three-position adjustable but you have to remove nuts and bolts. For training different sized students this would pose a problem.

From the mechanic's point of view one must use a ladder to check the oil—it's much too high for a man to reach. One can attempt it by leaning over the front cowl, but it's quite a chore for a short-limbed fellow. The Air Force type fuel strainer has been hidden down in the belly of the air-frame. We checked it and you have to bite knee-caps as you squat under the low center-section. A quick drain strainer would save some irritation.

To balance the above, mechanics will like the ease of servicing the interior. Three belly plates, held by Dzus fasteners, cover the entire belly. With the front plate removed, one can stand on the ground and service any part of the front cockpit.

The Rawdon brothers are now hard at work on a four place low-wing airplane. A model has been built and it promises to be right in the running.

There is and will for the next few years, be a critical shortage of training-type aircraft. It is my opinion that this airplane is superior to any primary trainer of World War II days, and recommends itself to the kind of quick training we will need.

Jack Chastain knows that he can solo any normal person in eight hours and less. That's not bad time for a faster, low-wing trainer. He further maintains that it is a far better airplane to train in than the light, high-wing type. I won't hazard an answer on this, but I do feel that the Rawdon boys are prepared for either war or peace in their "two-for-one" Rawdon T-1. END

15 YEARS AGO

FROM the September 1936, issue of this magazine:

Lace skirts are being worn this year by Army planes in the form of perforated wing flaps installed on Northrop attack monoplanes, made to eliminate tail shimmy.

Vought Navy Scout Bomber Type SB2U-1 marks a radical departure in every line from previous practice. This first low-wing will probably create a considerable compression effect upon the deck of the carrier and, in so doing, will act

with flaps in maintaining lift at low speed. It will be interesting to follow this new design to discover just what advantages, if any, this has over the biplane.

The Sikorsky S-43 amphibion transport

is the largest of her type. This boat is the first of two 16-passenger ultra-modern transports.

The Hall Aluminum XP2h-1 is one of the most modern flying boats to be built for the Navy. Of all-metal construction with fabric covered wings, it carries a crew of seven; has a wing span of 112

feet; top speed of 140 m.p.h. and a cruising range of 4,000 miles. The four liquid cooled engines are mounted in tandem.

Sign of the Times: Superflea Aircraft Company of Lawrence, Kans. advertised: "$125 buys two-place airplane, steel fuselage, factory built, nearly complete, less motor, uncovered. New 9 cyl. air-cooled 8 h.p. LaRhone, $45."

TWENTY YEARS AGO

Harold Gatty, co-pilot with Wiley Post on the recent round the world flight, used an ingenious device which he invented for telling the ground speed of a plane in flight. It can be used over unbroken seas, or even above fog and cloud banks.

UNIVERSITY OF MICHIGAN LIBRARIES
DIGITIZED BY ...

Bill Renshaw
State Fairgrounds
Indianapolis 5, Ind.

VIA AIR MAIL

Flying Farmers, U.S.A.

CRITICISM

This columnist, long critical of the methods used to sell private aviation, congratulates the Piper organization for the outstanding job it did at the annual convention of Aviation Writers held recently in New York.

After Republic and Grumman jets had contributed their final "swish," the Piper folks wheeled out their latest creations to put on exhibition that almost stole the show. Landing and taking-off inside a 140-foot circle, the Piper airplanes got a big play, especially from the scribes who normally write only about military aviation. Private aviation has waited for the "world to wear a beaten path to its door." We're glad to see the Piper folks on the beam.

"Flying Farmers in Corn Country," a book written by Homer Croy, noted agricultural writer, is pretty good proof that we haven't done a very good job of exposing writers to private flying. Editor Croy in a chapter titled "What's New on the Farm," says: "The sum and substance of it is that a farmer seriously using an airplane for farming has been kicked by a mule." (Midwestern flying farmers wanted to know where they could find a mule).

Continuing his comment, this agricultural authority added: "It gets down to this: A few rich farmers have planes (they make their money some other way) and have organized clubs, just as they organized automobile clubs in the early days, and they fly around in these planes and tell how useful the plane is. It makes a good story, but, alas, there's not a word of truth in it." The author concluded his diatribe with—"A plane on the farm in the foreseeable future will be about as valuable as a left-handed monkey wrench." Knowing flying farmers, we feel sure that many of you would like to answer Brother Croy. This column will welcome your letters.

* * *

DE-ICING BY PLANE

Highway travel may be made safer by using planes to spread de-icing material if the suggestion of honorary flying farmer Howard R. Lathrope is carried out. Lathrope, Extension Agronomist at Purdue University, says a low grade nitrogen fertilizer, if applied to icy highways by low flying planes, would melt the ice and fertilize the berm. This firmer berm would eliminate another motoring hazard. Lathrope says that many auto accidents would be prevented if only hilly highways were treated with de-icing chemicals. He also points out that ammonium nitrate or a 50 per cent grade of potash would do an excellent job of melting highway ice. Both of these fertilizers, as well as nitrogen, could be applied with great speed by airplanes equipped with hoppers. Under the supervision of Ralph Young, Agricultural Aviation Coordinator in Ohio, a plane successfully de-iced highways last winter by spreading salt.

* * *

STATE LANDING MAPS

We've long contended that all flying farmer strips should be listed on state charts. With the closing of more and more airports, the listing of farm strips can well become a tremendous safety factor. We know of many instances where pilots, by referring to a state chart, have located and landed safely on a farm strip, when weather made further flying hazardous. The printing and distribution of state maps listing all landing areas is one thing all state aeronautical bodies can and should do.

* * *

AIR MAIL

Ever wish you had some way of recording all those fine ideas you get while on cross country flights—ideas you find so hard to recapture once you are back at home?

Frank Andrew, Flying Farmer and Agricultural Extension Engineer, University of Illinois, has worked out a way to do just that.

Thinking primarily of the time he could save, Engineer Andrew recently fitted a dictaphone into his Ercoupe. It worked so well that he now uses it not only to record ideas but to dictate most of his correspondence. He reports letters written aloft while relaxed just naturally read better.

* * *

ABOUT SAC

"I am in favor of State Aeronautical Commissions. I think they can serve the flying public to a great end." That is the way E. M. "Tex" Anderson answered our recent query as to what should be done to save many State Aeronautical Bodies from winding up in the trash heap.

Tex, who is vice-president of the National Flying Farmers Association, went on to qualify his "yes" answer by saying, "I do not favor commissions with a lot of rules and inspectors like a few states have. Such commissions make it as difficult to fly as possible, thereby hampering aviation."

Anderson concluded by suggesting that anyone interested in getting their commission "on the ball" would do well to consider the Kansas setup.

THE WEEMS LINE includes many navigation aids and instruments which are standard equipment with U. S. Air Forces, major air lines and foreign governments. Many are navigation "musts" for pilot and student alike, especially the Weems Mark II Aircraft Plotter, the Dalton E-6B, or Mark VII Computer. A few of them are described below. Many others are available.

WEEMS MARK II PLOTTER: Scale fits sectional and world air charts. Used for plotting bearings, courses, measuring distances, constructing wind diagrams and angles. Only $2.00.

DALTON E-6B COMPUTER: Two sides. One for solving all vector problems—wind, true heading, ground speed. Other side graduated for computing speed-time-distance, fuel consumption, air speed and altitude corrections, as well as statute-nautical mile conversions. Only $10.00 complete.

DALTON MARK VII COMPUTER: Vector side "mocks-up" track-drift-true heading triangle, allows simple, easily oriented setting-up and solution of all wind problems. Computer side for speed-time-distance, fuel consumption, air speed and altitude corrections, and statute-nautical mile conversions, plus erasable air speed calibration chart and flight log. Only $5.00.

WEEMS PROPORTIONAL DIVIDERS: Given any two of three quantities (speed, time, distance), you can find the third in a few seconds. $24.00.

CROSS-COUNTRY COMPUTER: The well-known Mark VIII Computer with addition of flight log and securing straps. Solves all speed-time-distance problems. Only $4.00

IMPORTANT NEW BOOKS: *Flying The Omnirange* by Zweng. Tells how to fly cross-country by means of new Omnirange facilities. $4.00.

Practical Air Navigation by Lyon. Invaluable to pilot and student alike. $2.50.

Instrument Flying by Weems & Zweng. $4.50.

Electronic Navigation by Orman. Explains workings of Radar, Loran, etc. $4.50.

Government Charts and Publications: A complete line.

WEEMS AIR NAVIGATION SCHOOL: Established 1927. Resident and Correspondence Courses. Send for details. Enrollment approved under G. I. Bill.

"See Your Aviation Supply Dealer"

OR, WRITE DIRECT FOR FREE CATALOG

Address Department 5
Weems System of Navigation
Annapolis, Maryland

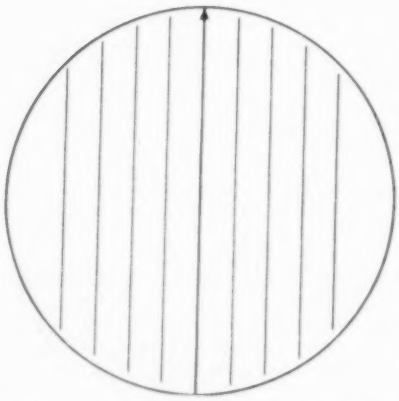
AIR WSN WEEMS SEA SYSTEM OF NAVIGATION
ANNAPOLIS MARYLAND

Cheese-box

(*Continued from page* 33)

along the red lines. The red arrow of the centerline on the grid should be pointing forward, as should the black protractor scale on the lower disc. Read the number of degrees indicated by the red arrow on the lower black disc, and this will be your drift. If the arrow points to the left of the zero mark, your drift is to the left; if it points to the right, you're drifting right.

Degrees are marked in black as indicated.



Red parallels are ¾ths of an inch apart.

It may not be as accurate as a regulation drift meter, but the ease of installation, small weight and size, and economy, make possible its use in small planes whose owners would never dream of installing a drift meter. The guidometer will not give a reading accurate to one degree, but it is sufficiently accurate for lightplane contact navigation. In fact, unless he has an automatic pilot built into his soul, it is highly unlikely that any pilot can fly a lightplane, by magnetic compass, with a consistent accuracy of less than 5°.

No claim is made that the guidometer presents any serious competition to the gyroscopic drift meter, but it is a mighty handy instrument to have for the price of a gallon of gas (plus a little cheese) and an hour's time.

Having observed his drift angle by means of the guidometer, the pilot unaccustomed to using a drift meter may wonder what to do with it.

The most obvious use will be to use it to correct for wind. Unfortunately it is one of the sad facts of life, as far as precision navigation is concerned, that if the wind is drifting you 15° off course, a correction of 15° is not absolutely accurate. The chances are decidedly against the drift and correction angles being identical. However, the difference between the drift and correction angles in most cases is so small that for all practical purposes they may be considered identical. It is a standard practice among Air Force navigators to consider the drift angle equal to the correction angle.

The guidometer can be extremely useful at the start of a cross-country, if you take the true course as read from the map, correct for variation and deviation, and start flying with that heading on the compass. As soon as possible note the drift angle on the guidometer and correct that amount on your heading. The resulting heading should carry you pretty well to your destination, provided there is no appreciable wind shift en route. A wind shift will immediately be indicated on the guidometer and you can shift your heading accordingly.

By taking two drift readings on different headings, it is possible to find out the wind direction and velocity, a process which is explained in any good navigation text. The procedure usually involves the use of either a computer or a prepared chart.

Having explored the drift meter possibilities of the guidometer, the pilot still has not got his full money's worth out of this handy instrument, however. Because of the ease of moving it to different positions in the plane, it can be used to take visual bearings to determine fixes and distance.

This is similar to that of an instrument used in ship's navigation (pelorus to you, if you happen to be an old salt). It is also similar to the use of a radio compass except that bearings are visual instead of radio.

For this second use of the guidometer, attach the instrument to the *front* windshield of the plane or to the top of the instrument panel. Again twist the wire so that the discs are horizontal and the black zero line is parallel with the longitudinal axis of the airplane. If the weather is cold, be careful in twisting the instrument not to crack the plastic, or you will soon be in the market for more cheese.

Ever find yourself in a situation where you can sight familiar landmarks but can't tell exactly where you are? Perhaps you see a known mountain peak on one side of the plane and a distant lake, city or other known check point on the other side. Simply revolve the top grid of the guidometer till the red arrow points to the first check point and read the number of degrees. Then adjust it again till it points to the second check point and again read the number of degrees. Plot these bearings on your chart in the same manner as you would radio bearings, drawing a line from each check point, and the intersection of these two lines marks your position.

Just as with a regular drift meter or any other instrument, the pilot may need a little practice in order to become proficient in its use. He should not be discouraged if the first reading is not too accurate. Accuracy will be affected by very rough air and the pilot should try to keep the plane as steady as possible during readings.

For a pilot who finds long cross-country trips somewhat boring, use of the guidometer is bound to add mental zip to the flight, and if the gadget is used as a matter of interest on routine flights the pilot will have it ready to use in a pinch when the going gets rough.

It is unlikely that the Sperry Company is staying awake nights worrying about serious competition from the guidometer, but there is probably no other instrument which will give such a large return for such a small expenditure of time and money. Where else, for less than a dollar, an hour's time and a bit of your favorite cheese can you get a handy navigation instrument especially tailored to the lightplane's needs? END

THE LIBRARY

AIRWAYS ABROAD, by Henry Ladd Smith, published by the University of Wisconsin Press, Madison, Wis. 1950. 355 pages. Illustrated. Price $4.00.

The story of the development of world air routes by U.S. commercial airlines after World War II traces the history of an important transport system that progressed rapidly through the phase of rugged individualism and government support to international cooperation. The author says that civil aviation provided "the first post-war experiment in world cooperation to be carried through to a conclusion." Exciting reading, the book is well-heeled with source material, and should appeal to students of history, political science, and economics as well as those interested solely in aviation.

AIRCRAFT ENGINE MAINTENANCE AND SERVICE, by Col. Rollen H. Drake; published by The Macmillan Co., New York. 1950. 237 pages. Illustrated. Price $5.00.

A simply-written, well-illustrated handbook on all aspects of aircraft engine maintenance and repair, with especial attention to inspection and approved repairs required by the Civil Aeronautics Administration. The author has designed the book for use by trade schools, junior colleges and high schools, as well as for maintenance crews and certified mechanics. Good index for handy reference.

A STUDENT GUIDE FOR AERONAUTICS, by Merrill E. Tower; published by Aero Publishers, Los Angeles in 1950. 141 pages. Illus. Price $1.75.

Here's an aviation study guide to give high school students an understanding of basic aeronautics. The author, who teaches in Los Angeles high schools, has combined eight years' experience with California aviation school requirements to produce a handy laboratory handbook.

I Flew

(*Continued from page 17*)

such conditions and he must descend no matter what the terrain is below.

The IL-12 has two aircooled radial engines of 14 cylinders each—type AS82FN, constructed by Svecov with 1,750 b.h.p. take-off power. They are pure injection engines without carburetors and are a partial copy of the German BMW.

Constant-speed propellers are of Russian design. The blades are activated by hydraulic pressure—but from one side only. The other side is spring-loaded. They are not like the Hamilton Standard units which give oil pressure from both sides. The revs do not keep constant on these Soviet props and the control has to be adjusted every five minutes or so.

Czechoslovak Airlines used IL-12's on the Prague-Paris run from the summer of 1949 to December. At that time the airplane had 32 seats with a gross weight of 38,029 pounds. At the beginning of 1950 all IL-12's were grounded on order from Moscow and none of us ever discovered the real reason. In May, 1950, the planes went to Moscow for modification and when they came back gross weight was only 35,494 pounds and there were seats for only 18 passengers.

The planes went into service again, this time on short routes to Budapest, Warsaw, Copenhagen and Stockholm, so that the flying time between refueling points did not exceed three hours. Fuel tank capacity of the IL-12 is about 1,056 U.S. gallons and average fuel consumption is 172 gallons to 182 gallons per hour.

The radio sets installed by the Russians were useless for international routes and to fly the western routes the planes had to be re-equipped with standard radio sets, Bendix radio compasses and VHF radios taken from unserviceable C-47's. In addition, the Russian artificial horizon had to be removed and an American artificial horizon substituted because no Czech pilot was able to fly by the Russian instrument. Western artificial horizons are constructed so that the silhouette of the plane on the instrument is firmly connected with the plane itself. The movable part represents the artificial horizon. This means that the aircraft itself is in exactly the same position as the silhouette. On the Russian instruments, the silhouette of the plane is movable, so that the artificial horizon indicates the plane's position in exactly the opposite direction from ours. Our pilots, used to Western instruments, had difficulty reading it correctly.

Before the IL-12's were grounded in December of 1950 I had been flying them to Paris. From the pilot's view they were tricky to handle. I found the aircraft completely unstable in bumpy air because of its short, rounded fuselage. In rough air I had to reduce the indicated air speed from 183 m.p.h. to 155 m.p.h. and put the landing gear down. Immediately after that, the instability of the plane increases so much that the ailerons are absolutely ineffective. After maximum use of ailerons it usually takes up to 15 seconds to get the plane into normal. Even in still air the IL-12 vibrates so much that it is impossible to read a newspaper in the cockpit or rear part of the cabin. After almost every flight, I counted a number of missing bolts in the fuselage and center section. And in stormy weather I was honestly afraid that the airplane would disintegrate.

After each flight the plane had to be inspected very carefully on the headquarters base and it usually took two or three days to get it serviceable again. Before my escape flight from Czechoslovakia there was a rumor that the gross weight would go down another 1,100 pounds.

This is the inside information on Russia's best transport.

It isn't a joke that we regarded flying the IL-12 in bad weather as one of the Communist punishments of the ex-RAF pilots with Czechoslovak Airlines. That this opinion was also shared by others is confirmed by the fact that in the bad autumn weather no Communist pilot of the airline was ever sent out with the IL-12.

BELGIAN IL-12 REPORT

Since receiving Captain Prchal's article, FLYING *has received the following communication from A. Roggemans, Mechelen, Belgium, an employe of Sabena Airlines, with additional information on the IL-12 which he gathered at Brussels Airport. Mr. Roggemans writes:*

"The ASh engines are very good indeed, one slight push on the starter knob and off they go . . . what a difference from some American engines. The inside of the cabin is lovely and the windows are very large.

"The plane has some poor characteristics, too. The nosewheel is not steerable, for instance. The pilot has to steer with his brakes and engines, so you can imagine how the plane must bump up and down and how the passengers must feel inside.

"You wrote in your article ["Russia Builds a Transport," December 1950 FLYING] that during loading a detachable tail strut is fixed to the tail bumper . . . don't ever try to enter an IL-12 without the tail strut being attached, because the tail will come down. When the plane comes on the parking apron the pilot cuts No. 2 engine, the stewardess opens the cabin door and hands the strut, kept in the cabin, to the ground crew which fixes it to the tail bumper while the No. 1 engine turns at full r.p.m.'s.

"When the okay signal is given, the No. 1 engine is cut and the plane bumps heavily on the strut. Same thing happens when the plane is leaving. No. 1 engine is started and while turning at full r.p.m. the plane tails up and the strut is removed and handed back to the stewardess. She closes the cabin door, gives the okay signal to the pilot, and he starts No. 2 engine and away bumps the plane. But what a mighty take-off once it gets underway . . ." END

AGE 17—THE MOST IMPORTANT STEP

. . . If you want the AIR FORCE or ESSENTIAL WORK you must train for it . . . . before it is too late.

At 17 whether you realize it or not, you MUST make a vital decision—Whether you will prepare yourself for maximum service to our defense program—for better military qualification—for a future civilian career in connection with either military or defense—or whether to continue your present routine and take a chance on the future.

WISE YOUNG MEN ARE ACTING NOW. They are gaining skills that will qualify them for better positions in either military or defense fields. At 17 you still have time for training. AVIATION IS AN ESSENTIAL INDUSTRY IN PEACE OR WAR . . . and the FUTURE for one trained in Aviation can be almost without limit. SO DON'T DELAY WHILE YOU HAVE TIME FOR THIS TRAINING.

Since 1929 CAL-AERO has trained young men for Aviation Careers through peace and war, specializing in—

AERONAUTICAL ENGINEERING
MASTER AVIATION MECHANICS
JET ENGINE Maintenance & Overhaul

MAXIMUM TRAINING IN MINIMUM TIME

TO MEN 18 OR OVER—Regardless of your draft status, let us send you information about Aviation Training for defense and eligibility for military preference.

TO PARENTS—If your son is approaching the draft age, give him a chance to get this finest training. It may be important to him; and to you!

CAL-AERO is an accredited higher institution, listed by the U. S. Office of Education. Engineering Curriculum approved by E. C. P. D. . . . recognized by the U. S. Air Force and the U. S. Navy — Cal-Aero Engineering graduates are qualified educationally to become AIR FORCE CADETS, NAVAL AVIATION CADETS and OFFICER CANDIDATES.

During World War II Cal-Aero was first and trained more than 26,000 pilots and 7500 technicians for the military Air Forces, in addition to our civilian graduates going into essential aircraft work.

TODAY — Cal-Aero is again first in training military personnel, under contract to the U. S. Air Force, in addition to our regular civilian program—WHAT BETTER RECOMMENDATION WOULD A SCHOOL HAVE!

CAL-AERO TECHNICAL INSTITUTE

GRAND CENTRAL AIR TERMINAL
GLENDALE 1, CALIFORNIA

MAIL COUPON TODAY

CAL-AERO TECHNICAL INSTITUTE
Grand Central Air Terminal, Glendale 1, Calif.
Send full information and free catalog, immediately

☐ AERONAUTICAL ENGINEERING
☐ MASTER AVIATION MECHANICS
☐ JET ENGINE—Maintenance & Overhaul

HOME STUDY COURSES
☐ Aeronautical Drafting ☐ Aircraft Blueprint Reading
☐ Stress Analysis and Design

NAME _____ AGE _____
ADDRESS _____
CITY _____ ZONE _____ STATE _____
HIGH SCHOOL ATTENDED _____ Graduated: Yes ☐ No ☐
Check one: ☐ Veteran ☐ Non-Veteran F-9

IT'S A ROCKY ROAD

A pilot reports on the effects of turbulence on planes and missiles traveling high skyways.

By HY SHERIDAN

THERE is a most serious problem in flying the jets and even the present high altitude airliners. Skeet Perkins, with the patina on him of many years of flying, an airline captain who has long practiced the idea that it is better for a pilot to be conservative than to find himself in preservative, was flying along at a high altitude over Mexico in perfectly clear air, when all of a soon, as Sadie puts it, the airliner hit a bump that was built like a camel.

The airliner must have been badly strained, how close to the fail point no one knows. Passengers were tossed about the cabin, but only one of them was hurt, a bull fighter. He was tossed into the air and he came down astride the seat.

You remember, the text books and the pedants who had more hair on their heads than their chests used to tell us that in the upper air, 25,000 feet or more, there was no significant turbulence, and none whatever in the stratosphere. Over 15,000 feet there was little except that associated with cumulus and nimbus clouds. Scientific facts supported their conclusions, they pointed out.

Now, that's the trouble with scientific facts, they can support some of the dog-gonedest conclusions; scientists just hate to say, "We don't know." Sure they know. They know everything, even those things that are not so, and I ought to know about this because I am an amateur scientist myself. I will get my professional papers when I can believe that space is curved and that time goes sidewise.

The truth is that the upper air is not quiet. This sort of thing is now raising hob with the programs of the jet airliners, the fast military planes, the missiles, and to some extent our present airliners.

We have two jobs facing us. One is to forecast the areas of upper turbulence, to plot it so that the pilots or the missile guiders can know what to do and when to do it. Because the turbulence in the upper air can raise the old Harry, and we all know what that old term has come to mean these days.

We noted the case of Skeet and the bull fighter in the Dizzy Six. There have been quite a few cases like this. What is much more serious, some of our sonic and supersonic planes have simply come apart when flying in perfectly clear air and it is thought that a good many of them hit serious turbulence.

Our high altitude research balloons have given us a good deal of data on rough air aloft. Our missiles have been knocked about and thrown off path. Even our V2's have tumbled end over end, and some of them carried cameras which left us a good record.

To forecast and chart rough areas will require some thinking. First of all we must try to account for, to smell out the causes of, the strange condition.

The next job is to make our airplanes so that they will withstand the rough air. Our passengers cannot stay strapped in their seats at all times. Our jet pilots from time to time take an awful beating when they run into turbulence unbeknownst at high speed. A pilot likes to land with his wings on.

There is the problem of charting and accounting for the rough air. There is the problem of softening up the effects of the rough air that is run into.

The causes of rough air aloft are being prodded out of hiding. One such cause is the Jet Stream (FLYING, June, 1951), that mysterious ribbon of air that scoots along at such ungodly speeds. The edges of that flume of wind at superhurricane speeds are associated with turbulence because of sheer, the scientists have found. There is another kind of rough air, another type and another cause.

Your modest reporter thinks that he has made a discovery. I wish to offer it to the Air Force and our meteorological scientists, who are very fine people for all my ribbing, for research.

I have been flying along at 20,000 feet, say, in clear air, or more usually have been climbing up to that altitude, and then, suddenly, the air would be a bit choppy, uncomfortable for my passengers. It used to be, you know, when flying the old reliable DC3 that when we got some choppy air we went up and that usually cured it, for these were sun bumps or bumps associated with the ground or with lower clouds.

Here is a different thing, though. At first I thought that such areas of choppy air were associated with wind shifts. Later I found out something odd about them. I could often get up out of the choppiness or down out of it by a change of 500 feet, that is, 500 feet up would cure it, or 500 feet down. I would do one or the other, of course. Then, after some months I am ashamed to say, I wondered if the choppiness were just local, or was there an extensive blanket of it.

Now I should like to offer an hypothesis. (For the information of my fellow oafs I wish to say that I have just found out that hypothesis is sciencese for sneaking suspicion.) One body of air tends to maintain its identity, its integrity, with respect to adjacent bodies of air.

For example, you can blow a smoke ring and the smoke ring spins in toroid style and, according to the kinetic theory, the molecules that compose it have centrifugal force but where the centripetal force comes from I do not know, at the moment at any rate. Just the same, as glider pilots well know (see Briegleb's fine stories in FLYING), a mass of air tends to stick with itself.

The roughage that exists in a layer only a thousand feet thick and exists as a blanket for hundreds of miles has, I submit, an explanation which I hope will permit forecasting.

According to what little research and testing, probing rather, that I could make with an airliner, this very common type of rough air is caused by two layers of air rubbing upon each other. (Glider pilots please note and give us some help.)

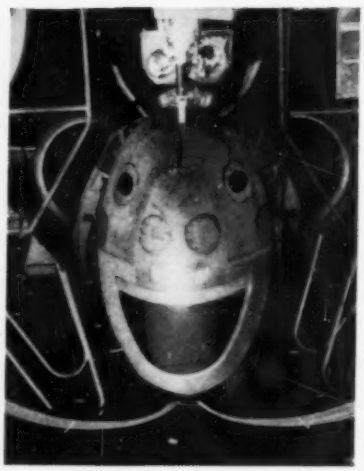
It seems to me that when a layer of air is moving in a direction with respect to the earth that is not quite the same direction as another layer, say below it, the two layers will rub one against the other, and on the rubbing interface, what might be called the horizontal sheer, the air is rolled up. There is your choppiness. Balloon runs and even forecasting should help us here.

There is another type of high bumpiness which I have, as a guess, associated with what I call a cataract. A cold layer of air, or a heavy one and it ought to be cold, can be sliding over another and lower layer of air, and find a weak spot, and the upper layer then breaks through and flows down like a water fall. If the air involved is dry enough or does not have enough condensation nuclei the cascade may be invisible to the eye.

There are also upward cataracts which can be most sharp and damaging and some of these arise from what I call a

(Continued on page 56)

WHAT'S YOUR GUESS?



DO YOU know what this ebullient creature actually is? Here are some hints: It's not "The Thing" nor is it a robot. It is a Lockheed product which has been nicknamed "Yak-Yak." Despite the glee displayed "his" work is of the utmost importance. Stumped? Turn it upside down for a better view and the answer.

Recognize it now? It is a photo of the nose of the Lockheed T-33 twin-seat jet trainer used extensively by the armed forces.

BETTY SKELTON'S NOTEBOOK

Midget Tips

Inquiries are pouring in asking where midget racers can be found . . . For you future race pilots, here are a couple of tips on two top-notchers that—well, just might be available.

CURTIS PITTS, well-known aircraft designer and builder of Gainesville, Fla., has learned he's going to be a grandpa, so—announces it's about time he gave up the midget race business and left it to the youngsters. His famous little midget racer, #8, has crossed the finish line with top honors in both the Miami and Cleveland National races. The flashy red and cream ship has proven to be keen competition for some of the fastest racers in the country . . . STEVE WITTMAN'S *Buster*, midget racer #20 (left), can unquestionably be called one of the hottest midget racers ever built. *Buster* has won both the Goodyear and Continental races in Cleveland and Miami with flying colors, as well as a reputation for being a winner throughout the world.

DAF Salutes Test Pilot

We're might proud of civilian test pilot, JOHN McGUYRT of Republic, who was cited for heroism and received a Department of Air Force award when he "voluntarily risked his life to preserve equipment of great value to the Air Force by successfully landing an experimental F-84."

Lone Star Stars

I brought Lil' Stinker all the way from Florida to join 300 other pilots in the 2nd Annual Caddo Round-up at Beer's Field (right) near Marshall, Texas. Beer Smith, owner of the newly-paved 48-foot strip on the edge of the lake, has made the spot a flier's paradise. He offers fishing camps right on the edge of the strip, wonderful fish dinners and a spacious clubhouse—not to mention the annual Round-Ups (new word for air shows). Wish more operators could have the enthusiasm of Texas' Beer Smith.

Back In Formation

In 1949, when BILL FENTON—of the USAF's famous Fenton and Fitzgerald T-6 acrobatic team—was seriously injured in a landing in Washington, the nation was immediately cognizant that he would never fly again. But now our Long Island spy tells us that Bill was up over the Sound running through the most beautiful formation acrobatics he'd ever seen . . . Welcome back in the blue again, Bill! . . . Two original members of the famous jet acrobatic team—the now inactive USAF's "Acrojets" are now stationed with the 86th Thunderjet Fighter-Bomber Wing at Neubiberg, Germany. They are MAJOR JONES E. "JONESEY" BOLT and CAPT. ROBERT C. "TOMMY" TOMLINSON, and I bet as they scream through German skies, they dream of the day when the "Acrojets" will fly again.

Betty Skelton

WHAT A BUY!

Regularly $175.00

only $69.50 includes tax

CALENDAR CHRONOGRAPH WITH 12-HOUR RECORDER!

The finest all-purpose wrist watch value we've ever offered! Internationally famous 17 jewel swiss movement. Extremely accurate and endurable timekeeper. Handsome, thin, rust proof all-steel case. Automatically gives **month, day** and **date.** Has sweep-second hand ½ hour and **12**-hour recording dials. It's a stop watch, tachometer. It's anti-magnetic and shock-resistant. Truly the most complete watch. Every flyer, doctor, scientist, technician, engineer, sportsman should own one. Brand new! Less than ½ regular price!

***Guaranteed:* Your money back in ten days if not satisfied for any reason. Mail orders promptly filled. Shipped postpaid for check or M.O. or will send C.O.D.**

Exclusive with

WHITE PLAINS WATCH CO., INC.

RIVER PARK 17C, WHITE PLAINS, N. Y.

BONANZA OWNERS!

REMANUFACTURED REPLACEMENT PLASTIC COVERED PROPELLER BLADES FOR MODELS 35, A35 AND B35 $289.00 (Customer furnishing usable pair of ferrules)

Now Bonanza owners can get immediate delivery on CAA approved, fully guaranteed replacement blades from Flottorp—manufacturer of more than 6,000 blades for Bonanzas. These blades are the famous "armor coated" type developed by Flottorp.

Write for name of nearest Flottorp Distributor

COMPLETE REPAIR SERVICE

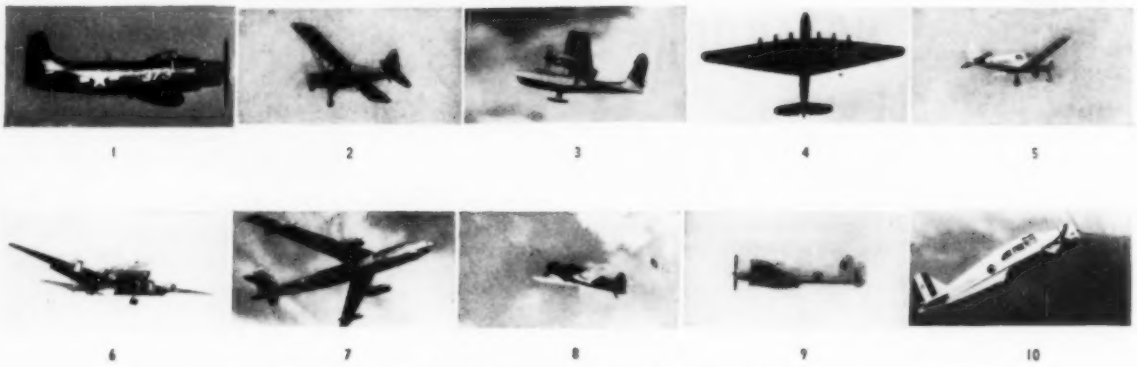
on all Bonanza propeller blades at moderate prices! Write for complete information.

FLOTTORP MANUFACTURING COMPANY

World's Oldest Builders of Aircraft Propellers

GRAND RAPIDS, MICHIGAN

CAN YOU SPOT THEM?



1 2 3 4 5

6 7 8 9 10

(1) Douglas AD Skyraider (U.S.N.) (2) S.A.I. KZ-VII (Denmark) (3) Vickers Supermarine A.S.R. Mk. 1 (Great Britain) (4) L-749 (U.S.N.) (5) Nord 1203 Norvetin 2 (France) (6) Canadian-built DC-4M (7) Boeing B-47A (U.S.A.) (8) Morane-Saulnier MS 474 (France) (9) Bristol Brigand T.Y. Mk. 1 (Great Britain) (10) Nord FN 310 (France)

A Rocky Road

(Continued from page 54)

pinch aloft. Two streams of air, or two masses, may come together at an angle in the sense that the blades of a scissors come together. Of course there is no vacuum in between them and this concept takes a bit of visualization. And so a spout is sent up as we often see spouts in the surf against a cliff or when tides impinge or in the white water below a falls. These would be a bit harder to forecast.

We have the problem of forecasting and avoiding the areas of rough air which can throw our guided missiles off course or destroy them if they fly very fast. We also have the problem of protecting the structure of our aircraft and the structure of our pilots and passengers, if rough air is suddenly encountered.

They learned something with that Canadian jet transport. It was fast, all right, for an airliner. Then one day they ran into rough air unexpectedly. The passengers were buckled in, fortunately, but according to the tale I hear they got doggone well spanked just the same. It was like the Oregon cowboy who first rode a Texas bull at a rodeo. "You did fine, ridin' that ol' bull," the Texas lads complimented him. "Shucks," the Oregon lad replied, "I was tryin' to turn loose all the time." There is a question in the jet liners whether it would be better to have the so-called safety belt buckled or unbuckled.

The first thing that the slip-stuck lads did (this is past tense for slip stick, meaning slide rule) was to put the passenger seats on shock absorbers. A proposal is to put in elastic safety belts.

There is the matter of protecting the structure of the airliner, and the work on this matter flirts with my respect. The American engineers and the English ones have spawned a pretty good idea. At first gander it would seem impossible to allow for an invisible gust because there is no way that you can know that it is there until it hits you and then it is too late. That seems sound, as an idea, but

* * * * * * * * * * * * * * * * *

"In January, 1950 . . . the 75-ton ship of mid-wing design, carrying 100 passengers, rides high and smoothly at better than 300 m.p.h. above an Arizona mountain storm. . . . The plane will have either four or six engines, in line and liquid-cooled, built into the wing and accessible to flight mechanics . . ."— Hall L. Hibbard, Chief Engineer, Lockheed Aircraft Corp., Popular Aviation, December, 1939.

* * * * * * * * * * * * * * * * *

it is not. Things are not what they seem.

The English had the sane notion. They said, well, we will catch the jolly old bump before it gets into the plane. So they put out a sensing rod in front of the jet plane. It sticks way out in front and you feel like Sir Lancelot flying one of the jobs, or at least an operations officer. An ingenious little doohickus, it senses what is coming and then by a no less ingenious electronic-servo mechanism it works the ailerons or flaps, or a combination thereof, in a compensatory sense.

For example, if the gust is an up one, the arrangement will sense this and tell the ailerons or trailing edge flaps, and these move upward, and this at once lessens the lift on the wing. The way it works is that the trailing edge surface gives the wing a down bump at the same time that the air gust gives the wing an up bump.

In practice this does not work any too well. The sensing lance cannot tell very well as yet the proportion between a horizontal facing gust and an up gust, for one example. And what is more important the mechanism is complicated and tends to get out of whack.

Our slip-happy boys figured that in view of the fact that our flexible wings flex they could use the flexing to iron out the bump. In other words, they make the bump iron itself out.

What happens should be clear. An up bump comes along. The wing starts up. When it starts up it works a mechanism so that the aileron or a trailing edge affair like an aileron moves up also, with respect to the wing, and so the lift is decreased. The same thing happens to a down bump. The mechanism is pretty simple. Where the cuteness comes in here is that there can be no up kick to the fuselage until the flexible wing comes up, and just as soon as it starts up forces are created to keep it from going up far or going up fast; its own flexibility, properly geared, does that. We might say that in the American plan the bump is not compensated for but the jolt from it is.

END

WATCH THAT RUDDER

YOU'RE turning on final, coming in low. That wing looks awfully close to the ground, doesn't it? Besides, you want to see the landing area and that wing is in the way. What happens? You want a short radius of turn, yet you don't want to bank too much—.

Add a little inside rudder. That's it —now that outside wing is traveling faster and has more lift. Now, opposite aileron—that'll keep your bank shallow. So there you go, skidding around the turn. The plane *wants* to bank to take care of that extra rudder, but you won't let it! Think it over—.

Next time you find yourself skidding around a gliding turn—cross-controlling—you're probably on the edge of the nastiest kind of stall, because it almost always occurs close to the ground while maneuvering for a landing. Another insidious characteristic of this stall is that the plane will spin with the nose well below the horizon.

So watch that bottom rudder—especially in a gliding turn.

—B. L. Abram

UNIVERSITY OF MICHIGAN LIBRARIES

WELLINGTON

(Continued from page 25)

probably set a new record for the trip from Prestwick to Liverpool.

Fortune smiled on me, the sun shone and even the corridor between the balloons at Liverpool was relatively clear. I could see Ed standing on the tarmac as I circled the field. All was right with the world. Through my dreams, I had noticed a funny smell in the airplane on the way down, but my mind had been too taken up with pleasant thoughts to pay much attention.

Ed had brought several bags, which he had successfully smuggled through the customs, filled with all the good things that had long since disappeared from the English stores—cigarettes, candy, stockings. We piled the loot into the *Wellington*, and off we went.

Ed remarked on the peculiar odor in the cockpit as we taxied out, but we could not wait to get at those bags. As soon as we were in the air we ripped them open, and the air was so full of the fine aroma of candy bars and American tobacco that we soon forgot it again. Ed dove deeper into the bags and produced nylon stockings, then something diaphanous and lacy. He thrust them at me and almost blushed and, yes, there was a definite glint in his eye! Those two weeks in the States had not done any harm at all. He seemed to be trying to say something but could not quite get it out. The most he finally managed was:

"I have got something else in my other bag, I will go back and get it."

We had been unpacking in the well beside the pilot's seat, but Ed had left one bag back in the main body of the airplane. He rose now to open the door which shut off the forward cockpit from the rest of the ship.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

"There is very little doubt that the airplane is an accomplished fact . . . but has anyone considered the dangers that will follow in the wake of the new machines? . . . The age of comparative safety is at an end. Look to your lives, fellow mortals, and if you would be perfectly safe, voyage perpetually in mail-ships. They will be manned by experts and they will have the right of way."—Charles Battell Loomis, Century, July, 1907.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

As he turned the handle, a cloud of acrid smoke poured into the pilot's compartment. Confusion reigned!

"It's on fire!"

"Where's the fire extinguisher?"

"Where's an axe?"

"Where's the nearest field?"

When the tumult and the shouting had died down, we discovered that we were not actually on fire. The batteries, which were situated immediately aft of the cockpit, were smoking. Acid was pouring out of them all over the place and was dripping down onto the control cables. This particular *Wellington* was equipped with electric pitch control, and once the electrical system failed, the props would automatically slide into full coarse pitch. Obviously, we had to get down quickly.

Providentially, a small elementary training field appeared beneath us. Scattering *Tiger Moths* right and left, we hurled ourselves at the one short runway. Down at last, we just managed to stop with a screech of brakes short of the far hedge. We got ourselves and the precious baggage out of the machine almost before it had stopped rolling.

The moral of the story is that, if I had been paying attention in the first place, I should have investigated and located the trouble as soon as I smelled the first unusual whiff. Then there would have been no need to scare ourselves to death and put into too small a field in a hurry. Also, most of the damage to the airplane would have been avoided.

However, the story has a happy ending. I put in the usual snag report on the airplane and there were no complaints from headquarters. Ed and I were married the following week and managed to keep our minds sufficiently on the job to survive four more years of ferrying without incident. We returned to the United States in 1945. END

"It was getting awfully hot in here, sir!"

for CAA ratings

use the best . . . use the

Zweng Manuals!

Latest typical examinations included!

1. Airline Transport Pilot Rating: revised text and new typical examinations in the one authentic guide to an airline pilot job. **$4.00**

2. Instrument Rating: if you want to be an airline co-pilot you must have this rating. "Radio & Instrument Flying" prepares you thoroughly for the examination. **$4.00**

3. Flight Instructor: includes both the new oral and written typical examinations. **$3.50**

4. Private & Commercial Pilot Ratings: full text and latest complete typical examinations for both ratings, together in the best-selling "Aeronautical Training." Only **$3.50**

5. Ground Instructor Rating: with latest revised typical examinations. **$3.00**

6. Flying the Omniranges: this is the book that shows you how easy it is to fly the new VHF omnidirectional radio ranges. Presented simply, illustrated fully. **$4.00**

7. Aircraft & Engine Mechanics: text and typical examinations for both A. & E. ratings, together in one manual. New 1951 supplement with latest information included. **$4.00**

8. Flight Engineer: text & typical Boeing, DC-6, DC-4, Constellation examinations. **$4.00**

9. Airport Operation & Management: how to run a modern airport, large or small. A practical and detailed guide, full of concrete suggestions for greater income. **$4.50**

10. Aircraft Dispatcher Rating: text C.A.R., and typical examination questions. **$4.00**

11. Flight Navigator Rating: including the latest typical examinations. **$3.00**

12. Link Instructor Rating: link Trainer instructors play a big part in today's air program. This manual shows you how to earn your CAA Link Rating Examination. **$4.00**

13. Practical Manual of the E-6B Computer: more than 400 wind, time-speed-distance computer problems solved clearly, graphically. Invaluable for everybody who flies. **$2.50**

and these "must" supplies . . .

14. E-6B Computer: standard the world over. New model, with case and instructions. **$10.00**

15. Weems Mark II Plotter:— for all plotting and distance-measuring problems. **$2.00**

16. American Airlines Computer, case and instructions. **$6.00**

Please send me the following items which I have circled by number. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

☐ Payment enclosed ☐ Send C.O.D.

☐ Send me a free copy of your catalog.

FP

Name .....

Street .....

City and State .....

U. S. GOVT. MAP & CHART AGENCY

PAN AMERICAN NAVIGATION SERVICE

12021 VENTURA BLVD., F9 NORTH HOLLYWOOD, CALIF.

THE 1951 WHIRLFIZZ

By WRIGHT H. EVERETT

IT WAS A GLORIOUS, sunny day as Bud Crossfeed and I stepped out of the *Whirlfizz* office with J. C. Whirlfizz to inspect the new '51 model sitting out on the line. After a short routine inspection of the ship, Crossfeed and I would put the ship through its paces in the air.

J. C., the president of Whirlfizz Aircraft Inc., was indeed happy over the prospect of our intended appraisal of his baby. This, we felt, might be due to the fact that the C.A.A. had absolutely refused to come anywhere within a 25 mile radius of the *Whirlfizz* plant. Something about past experience, they hinted.

Glancing at the tail structure, I immediately became aware of the fact that the plane carried no "NX" markings; in fact, no markings at all. Whirlfizz hastily explained that he had received a waiver just a few days ago, from Washington, D. C., to the effect that no official would assume any responsibility of any type, size or color for the plane or its performance. At this point, Crossfeed suggested that we depart, report or no report, and spend the remainder of the day in a quiet movie, but the plane had aroused my curiosity, and we hung on.

It was apparent that the *Whirlfizz* had not been designed on the spur of the moment. In fact, it appeared as though some undergraduate of a second-class mining engineering school had spent at least four hazy evenings on the project.

Powered by a rebuilt, 28½ h.p. Throw-all engine with completely-opposed cylinders, the *Whirlfizz* is listed with a top speed of 135 m.p.m. (miles per month) and supposedly cruises at 106 m.p.m. As Crossfeed, J. C., and I walked around the ship we examined the construction. Complete with all-metal trim tab, the '51 is entirely composed of balsa and covered with thrice-doped pages from the New York *Times* magazine section (Sunday, July 11, '51). Mr. Whirlfizz pointed out that the production model would feature pages from later editions.

The landing gear is interesting to say the least. Incorporating all the features of the retractable type, it nevertheless has novel features of its own. As J. C. explained, the tires automatically deflate when they enter the recess in the wing, thus permitting more space for wing-rib construction. We nodded our approval of this innovation as J. C. went on to say that the only "bug" yet remaining is that they hadn't found a way to re-inflate the tires in the air. I then suggested we leave the wheels down for the coming flight, but J. C. stated that the tires would deflate anyway, up or down, and Crossfeed again suggested the movie.

I was indeed interested in the negative stagger of the biplane's wings, and inquired as to their function on the *Whirlfizz*. I was told that the arrangement had resulted from a mistake in the drafting-room. It seems that the engineer had drawn them on upside-down, on a morning following a wild weekend in Chicago. This completed the routine inspection of the new model.

FLYING's CHECK PILOT

EDITOR'S NOTE

This article is planned to help the pilot and the prospective plane owner save his neck. The author is not a professional test pilot. In fact, other pilots would be ashamed to call him a pilot. He tries to evaluate the aircraft through his own eyes, which apparently are not 20-20.

As we climbed into the spacious cabin of the *Whirlfizz*, I was impressed with the arrangement of the seats. The *Whirlfizz* seats three persons of normal size (five foot 1 inch or less) providing the individual in the rear seat does not object to hanging his feet out of the cabin window. The two, side-by-side front seats are adjustable all the way from the heel-between-the-knees to the knees-around-the-head position. The *Whirlfizz* has been beautifully appointed throughout, and features an exciting green and purple color scheme. As I glanced from the corner of my eye, Whirlfizz, sitting next to me, quietly slid two empty quart ice cream containers under the seat. Crossfeed, in the rear seat again suggested the movie.

The standard instrument panel features the following: clock, glove compartment.

The deluxe panel arrangement offers, in addition to these: clock that works, glove compartment that opens, Isenchometer.

When I inquired as to the function of the Isenchometer, Whirlfizz explained that he didn't understand the thing himself, but at least it never needed to be caged. It told something, he added.

After a brief warmup they turned the field lights on, and we took off. I climbed to what I thought was about 8,000 feet and tried a few head-on stalls. The ship performed strangely, and Crossfeed threw his check-pad away. Mr. W. then utilized the quart cartons, sharing one with Crossfeed. I suggested we land. All agreed.

I would like to mention right here and now, the interesting arrangement of the controls and switches as found on this unique aircraft.

The throttle was plainly marked with a "P" on the red hand-knob, and the prop pitch knob was marked "T". These are not to be confused with the former markings found on other ships. Mr. W. looked up from the carton long enough to explain that "P" meant "pour on more coal," and the "T" stood for "turn off the engine before leaving plane." I found this confusing, and suggested he change it on the production model, but he evidently wasn't listening.

I found the flap handle rather inconveniently located behind the rear seat, and discovered that the ash-tray was only a dummy. Whirlfizz didn't even blush!

As we made our approach to the field, I asked Mr. W. to turn on the landing-lights if he could find them. He nudged a switch under his seat, and the whole sky seemed to light up . . . behind us! The lights were mounted backwards!

I learned that this was so the pilot could see how much runway he'd already used up, and judge his next approach accordingly!

When we scraped up to the line on the deflated tires, Crossfeed leaped out and disappeared into the night.

We didn't bother turning the engine off because it turned itself off automatically . . . for good. Mr. W. and I headed for some coffee in the cafeteria.

"I must admit, Whirlfizz," I stated flatly over the flatter java, "that your plane has definite faults!"

"I realize that," he countered, "but it has one great advantage over every other plane on the market!"

"For heaven's sake, what?" I asked.

"It's definitely in the low-price field. Only $1,125 delivered!" he sang.

Whereupon I placed my order, and joined Crossfeed in the balcony. END

"And There I Was . . . "

A staid group of English officers wanted a lift to the front. After my ammunition cargo was loaded, the old C-47 was ready for take-off at Casablanca so I piled them all in the cargo department. Right after take-off, I trimmed the plane for level flight but the nose immediately dropped. Quickly I trimmed it again. This time the nose bobbed up—and I trimmed it back down. This continued for about half an hour. Finally, I decided to go back and check the cargo straps to see if the ammo was shifting.

On opening the door to the cabin, I faced a tall, mustached British officer—with a dart aimed at my head. The Britishers, it seemed, had set up a target and were having the time of their lives with a rousing game of darts. When one of them would score a bullseye, all of them would run to look. They'd then dash back for the next throw.

After a short discussion with the fellows, my trim trouble was cleared.

—Robert Fabrize

UNIVERSITY OF MICHIGAN LIBRARIES

Black Lightning

(Continued from page 18)

pared would be interception of attacking enemy bombers striking across the Arctic.

Although it is particularly adapted for defensive assignments over the vast reaches along the northern rim of the North American continent, the CF-100 also can play an important role as an offensive fighter.

Numerous tests have revealed that this streak of black lightning can serve, too, as tactical support for ground forces, as a bomber and as a long-range reconnaissance aircraft.

The CF-100's ability to get down to comparatively low speeds points up its tactical support possibilities. It is big enough (it's actually the first of a new breed of big post-war fighters) to take a considerable bomb load.

Performance of the plane is secret, but it has been authoritatively described as being at least two years ahead of anything similar in the United Kingdom or the United States. It averaged 638 m.p.h., not its top speed, on a flight from Toronto to Montreal, but that was before the Rolls Royce Avons were replaced by the new Canadian-built Orenda gas turbines. The CF-100 with Orendas flew for the first time late in June, and there was a marked improvement in performance.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

"Air trains coming? Visions of giant air trains crossing continents and unloading passengers and express at local stations by the simple method of detaching a glider, were awakened by the success of the Russian pilot, Fediosev, in a flight of 930 miles from Moscow to Koktebel, Crimea, with three gliders attached to his plane."—Literary Digest, **June 9, 1934.**

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

The Orenda has had several thousand hours of ground tests, some of unprecedented length, and was flight tested in a Lancaster and an F-86 Sabre fighter. It is the successor to the Avro Chinook, the first jet engine designed and built in Canada. The Chinook was primarily a development engine to be used to improve the design and supply answers for building larger engines for the RCAF.

The Orenda, first turbojet engine to be put into quantity production in Canada, has firmly established Canadian engine industry in competitive world markets. Its development was accomplished within 4½ years. It was earmarked from the beginning for the CF-100 and there is a possibility it may also power the Canadian-built F-86, standard day fighter of the RCAF.

Douglas Knowles, chief development engineer in Avro's gas turbine division, reports the rated thrust of the Orenda is in excess of 6,000 lbs. and its fuel consumption is about 1 lb. per hour for each lb. of thrust, both under sea level static conditions.

The Orenda has an axial flow compressor, six combustion chambers, single stage turbine, and an exhaust assembly. An interesting feature of the design is a flexible rubber thrust-ring, which allows some degree of angular misalignment of the center bearings to handle deflections of the engine structure during aerobatics.

Canada's role in air defense of the continent was strengthened by a change in government policy. During World War II, Canada produced more aircraft per capita than any other western country, but had to import its engines. Under government sponsorship after the war, an engine industry was begun and the decision made to concentrate on a new engine. From that new industry came the Avro Chinook and now the Avro Orenda.

Like its engines, the CF-100 is an original design which incorporates the best features in design and construction evolved in the United States and the United Kingdom. Much help was given Avro Canada by the Hawker Siddeley Group, of which Avro Canada is an independent member.

Designers of the aircraft are Edgar H. Atkin and John Frost, backed by a skilled team. Atkin was responsible for structures and armament of the Boulton-Paul *Defiant*, which did so much damage to the German fighters at the beginning of the last war. He also worked on the geometry of the R-101 airship and on design of the Sidestrand and Overstrand biplanes. He was in charge of the design of the Avro *York* and worked on the Avro 6, 8 and 18. Frost was assistant designer on the initial long range *Vampire* and supervised design of the DH-108 flying wing. He was responsible, too, for the wartime glider, the Slingsby Hengist, sister ship of the Horsa.

In planning the aircraft, care was taken not to duplicate aircraft building plans elsewhere. Equipment which could easily be obtained in North America in case of emergency was chosen. More than 300 suppliers and manufacturers throughout Canada have been organized to furnish components and equipment for Avro Canada. Almost daily, new sources of supply are being found for products which at one time were obtained abroad.

To insure that work on the CF-100 will go on uninterrupted and to help establish Canadian industrial and material sources from a national defense viewpoint, it has been Avro Canada's policy to keep looking in Canada until such sources are located, or to go out and set them up. As a result, many companies, such as George Godfrey, Dowty, Dunlop, Rotax, Shawinigan Chemicals, Delora Smelting, Aluminum Company of Canada, Atlas Steels, and Acme Gear and Screw, have been encouraged to set up new factories to supply materials for Canada's new jet aircraft and engine industry.

Of Avro's large yearly expenditure for materials and equipment, the largest proportion has been spent in Canada. The Orenda engine, for instance, is 95 percent built from Canadian materials. The Avro Jetliner is 80 per cent and the CF-100 about 90 percent Canadian built.

For the first time in Canada's history aircraft engines are being manufactured alongside the aircraft in which they will be used. END

New! Low Cost!

OMNIHOMER

OMNIHOMER

Now, a complete omni range and two way VHF in one Low Cost Unit. The new OMNIHOMER is precision built for peak performance. Installation is convenient: all controls incorporated in one simple panel, size 5¼" x 6⅞" x 10¼" and weighs only 10 lbs. installed. See your NARCO Dealer.

DELUXE

For those who desire the finest in omnigation, NARCO'S VTR-1 Omnigator has all the above features, PLUS ILS, marker beacon receiver, and 8-channel VHF transmission.

narco

NATIONAL AERONAUTICAL CORPORATION

AMBLER, PENNA.

Perfection in electronics

PILOTS

INCREASE YOUR EARNING POWER!
Get Your
INSTRUMENT and AIRLINE TRANSPORT RATING *Now*

Train at AMERICAN FLYERS—the world's largest Instrument and Airline Transport School—and insure YOUR future in aviation. American Flyers has trained more pilots for the Airlines than any other school in the country—MORE THAN ALL OTHER SCHOOLS COMBINED!

If you want the most modern and efficient flight instruction—whether you are a veteran or civilian pilot—write to us for our free booklet outlining the courses we have to offer.

VETERANS—Your certificate of eligibility from the Veterans Administration is all you need to enroll at government expense for any of our courses under the G.I. Bill of Rights!
Courses start at any time—no waiting!

Now you can obtain a H.P. or TYPE RATING on our DOUGLAS DC-3s under the G. I. BILL

AMERICAN FLYERS

MEACHAM FIELD FORT WORTH 6, TEXAS

MAIL THIS COUPON TODAY

Please send me FREE Booklet and data on
☐ INSTRUMENT ☐ CIVILIAN
☐ AIRLINE TRANSPORT ☐ VETERAN

NAME_____

STREET_____

CITY_____ STATE_____

Maintenance

(*Continued from page* 34)

through the firewall should be examined where they pass through the grommet for signs of abrasion and wear.

How to Clean Upholstery

Food Stains, including Ice Cream—(1) Hot water; (2) Lukewarm suds; (3) Commercial fabric cleaner. Use rotary cleaning motion.

Blood Stains—(1) Cold Water; (2) Dampen cloth with water, add hydrogen peroxide, and rub with a vigorous rotary motion.

Chewing Gum—First, scrape off excess with a knife, then dissolve remaining gum by blotting with carbon tetrachloride.

Candy Stains—First, scrape off excess with knife, then try in sequence until spot is removed (1) Carbon tetrachloride; (2) Cold water; (3) Lukewarm soapsuds; (4) Hot water.

Grease and Oil Spots—(1) Carbon tetrachloride; (2) Commercial-type grease spot remover.

Enamel, Paint and Lacquer Spots—(1) Use 1 part benzol, and 1 part alcohol in initial attempt at removal. If this fails, try (2) Turpentine applied sparingly.

Ink Spots—(1) Use sparingly any commercial brand of ink eradicator.

Lipstick—(1) Carbon tetrachloride; (2) Soap solution.

Fruit Stains—(1) Hot water; (2) Mixture of glycerin and ammonia.

Shoe Polish—(1) Mix one part chloroform, 1 part naphtha, and 1 part carbon tetrachloride. Use as a blotting fluid.

Liquor and Wine Stains—(1) Hot water; (2) Carbon tetrachloride.

Use cleaners in sequence listed. When one does not clean satisfactorily, the next one on the list may do so.

By far the most numerous problems connected with cabin maintenance are those that have to do with cleaning. In this respect, cleaning implies more than mere maintenance of appearence. All dirt is composed of chemical compounds, and when these compounds happen to be injurious to the materials on which they cling, deterioration in the form of rotting, rusting, corrosion, or moulding will occur.

The most critical cleaning problem in cabin maintenance has to do with the transparent plastic enclosures. These include the windshield, the cabin windows, instrument dial glasses, and sometimes portions of the cabin trim. The paramount rule to observe in cleaning transparent plastics is *never use a dry cloth.* These materials are relatively soft, and even a slight amount of grit entrapped between the cloth and surface will cut fine scratches that impair the transparency and optical properties of the sheet. Repetition of this practice will soon make replacement necessary.

Commercial plastic cleaners are available but a mild soap solution flushed onto the surface until the majority of dirt is washed away is just as effective. Finish cleaning by rubbing lightly with a soft chamois or sponge. Commercially available cellulose sponges are excellent for this purpose. Complete the job by flushing away the soap suds or cleaner with cold water.

Never use a commercial cleaning fluid on transparent plastics unless it is specifically recommended for the purpose. Many such cleaners contain chemicals which are harmful to the plastic, and will cause crazing or discoloration. Oil, grease and finger marks may be wiped away using a soft cloth wetted with kerosene, hexane, or ordinary white (not aviation or ethyl) gasoline.

Never use benzene, acetone, or lacquer thinners of any type. When purchasing a commercial plastics cleaner, the following are among recommended types: Lincoln M-3828 Liquid Cleaner; Franklin's Plexiglas Cleaner; Turco L-567 Cleaner; Noxon Cleaner Polish; Wilco Scratch Removing Compound No. 55; and Puritan's Plasti-Kleen.

After cleaning, the plastic surface should be waxed and polished to fill minute scratches and improve optical efficiency, and to provide a protective coating. Many automobile waxes contain abrasives and should not be used, and many furniture polishes contain chemicals which are harmful to the plastics. Recommended commercially available waxes include: Triple Life Wax; Franklin's Plexiglas Wax; 3M Auto or Simoniz Wax; Parko Eze-Wax; Permaseal; Duco No. 7 Wax; and Johnson's Industrial Wax No. 102-C.

For general cleaning of floor mats and upholstery fabrics, start with a vacuum cleaner to remove loose grit and dust. Follow by scrubbing thoroughly, using a hand brush and mild soap and water solution. Do not use more water than is necessary to produce a good leather as the excess will seep through and wet the underlying padding, resulting in excessive drying time. Leather upholstery material and leather cabin trim may be washed with soap and water, or with a special "saddle soap" compounded specifically for cleaning and polishing leather.

In most cases such general cleaning will fail to remove spots and stains from fabrics caused by oil and grease, paints and lacquers, food stains, fruit stains, ink spots, etc. The accompanying table lists such common soils and alternate ways of removing each. When more than one cleaner is listed, try them in the order given. In all cases, prevent the cleaner used from contacting surrounding surfaces. It may contain chemicals that will injure other types of material.

When the stain is of unknown origin, try to remove it by using various cleaners in the following sequence: (1) cold water; (2) lukewarm soapsuds; (3) hot water; (4) carbon tetrachloride; (5) any commercial fabric cleaner. When this sequence of methods fails it is probable that any chemical which would remove the spot would be harmful to the fabric as well.

There are occasions when battery acid may be spilled in the cabin, or the contaminated dirt clinging to the battery case or terminals may be rubbed off onto the fabric. This requires immediate attention. Quickly saturate the affected area with an ammonia solution to neutralize the acid and prevent it from doing further damage. When the acid spills on metal, the affected area should be washed thoroughly with a sodium hydroxide or ammonia solution, then rinsed with cold water. Inspect the area at short intervals thereafter to make sure that corrosion is not occurring.

Abrasive cleaners can be used on non-critical parts such as cabin fittings, trim, the instrument panel, etc., as long as they are not thinly plated with a decorative metal. Special polishes are available for chrome-plated fittings.

As airplanes, and especially lightplanes, are used more and more for business and commercial work, good appearance increases in importance. Cleanliness of equipment, and most particularly the cabin in which he rides, is one of the first things that strikes the customer's eye. And from the operator's personal standpoint, there is mental satisfaction in the knowledge that in maintaining cleanliness he is improving safety and prolonging the life of his airplane. END

IF it's not possible to get a check ride before flying a strange plane, take a little time to look over its design. This will give you a number of clues as to the plane's performance and characteristics.

For instance, a large vertical fin and rudder usually mean the plane is difficult to control on a crosswind landing. If it has a lot of dihedral, this will probably add to the difficulty. On the other hand, the large rudder—especially if combined with a dorsal fin running part way up the fuselage—should indicate that the plane is spin-resistant.

Note the size and amount of travel on all the control surfaces. Some planes need more use of the rudder while others are largely aileron-controlled.

Slots in the leading edge of the wing should indicate that the plane has good control in a stall.

Gliding characteristics depend on several factors—one is the cleanness of the plane. If it has struts, floats, landing lights, oversize tires and the like, you will have to make a steep glide to maintain flying speed.

Narrow gear, unsteerable tailwheels and poor visibility can affect take-off characteristics—watch out for them.

A small wing usually means high landing speed, especially if it is a speed-type wing and has a heavy wing loading. A tricycle-geared plane is easy to land because of good visibility and good braking.

—*R. O. Cooper*

In Paradise

(*Continued from page* 31)

on flying and club functions. Their visits to Ramey saved us many trips over the hazardous 90-mile road to San Juan.

After registering all applicants and obtaining student permits for those just entering flying, we elected officers and decided to buy an airplane. What we wanted was one cheap airplane with a four or five hour range so we could make over-water hops. It had to carry baggage, emergency equipment and carry two people and be right for student instruction.

Our search ended soon after it began. Miss Clara E. Livingston, operator of the Dorado Flying school in San Juan, the first woman engine mechanic licensed by CAA, and a close friend of the late Amelia Earhart, called to offer one of her reconditioned planes. It was an Aeronca *Chief*. We bought it and it has really filled the bill.

Training in ground school and in the air has been provided by experts. When the Federal Communications Commission was approached for restricted radiotelephone permits, the boss man in the San Juan area, A. T. Cline, Jr., drove out to Ramey and briefed us on the whys and wherefores of FCC regulations.

Then, the USAF's trained weather staff offered to supply instructors for our classes in meteorology, with emphasis on weather conditions in the Caribbean area. Outside airmen holding CAA A&E ratings instructed us on proper maintenance procedures.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

"At first flying will be a sport, but its commercial value will come later. In warfare, in science, its utility is already assured. I believe it may solve the North Pole problem."— Allen R. Hawley, Boston Sunday Post, **August 30, 1908.**

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

Flying safety is a subject constantly stressed in classroom and in the air. The Air Force has been conducting a continuing safety program for years and we, therefore, have a wealth of material on the subject for club members. One of our guest speakers was S/Sgt. John F. Luc, control tower chief at Ramey, who gave us a sort of "traffic cop" lecture on safe flying.

All navigation classes have been supervised by USAF rated navigators or pilots. And we have learned a lot on that subject during our hangar flying sessions.

Club members represent just about every occupation found in civilian life—from housewife to hospital technician. If there is a special job to be done for the club, there's usually an experienced person available to do it. And a big dividend is that wives of Ramey airmen are learning more about military aviation.

The club is not connected with the Department of Defense and, therefore, costs Uncle Sam exactly nothing.

Every month one of the weekly meetings, at which we discuss club problems, is devoted to social activity. One of the best of these social gatherings recently was an island-wide air meet attended by members of the club, outside private pilots and AOPA members in Puerto Rico.

The program included flour-bomb dropping, ribbon cutting and spot landings, topped off with a picnic lunch. The meet was conducted at an abandoned military air field now devoted to private flying.

The Ramey Flying club also has taken the Air Scout unit at the base under its wing. The scouts attend our social events and are given flights in the Aeronca.

While there is no restriction on attendance at club meetings and study classes, flying activity is held to 25 persons because the saturation point of available flying time is reached with that number. All civilian employees on the base and dependents of airmen are eligible for membership in the club.

We keep the USAF and the base commander informed of club activities through our sponsor, a commissioned officer. One of his jobs is to insure compliance with regulations affecting the club and the Air Force. Another is to act as liaison between the club and Ramey base.

As student pilots begin to solo, their X-country flights take them to Ciudad Trujillo in the Dominican Republic, or to St. Thomas and St. Croix in the Virgin Islands. Although these flights are never more than 40 miles from shore, every pilot is briefed by one of the Air Rescue Service pilots stationed here. Over-night stops at any of the cross-country terminals are authorized.

Because of their isolation, members of the Ramey base and their families must make full use of every available recreational and educational facility. Our flying club is the newest leisure time activity and it occupies considerable spare time of its members.

Brig. Gen. Sydney D. Grubbs, Jr., commanding general of Ramey, recently said: "The Ramey Flying club has my wholehearted support for its contribution to aviation. The growth of the Air Force is dependent, to an extent, upon such fine organizations as this. I sincerely hope that the interest in Ramey Flying club will continue." END

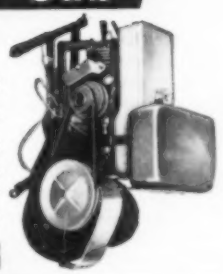
NEW! Nothing like it on the market!
ARGYLE Scooter Cub

FOLDS FOR CARRYING
UNFOLDS FOR RIDING
in 15 Seconds!

Provides transportation to and from airports away from home. Pays for itself in savings from taxis and rented cars. Fits in baggage compartment of any plane—folds to 15"x18½"x24". Weighs only 54 lbs.

WILL RIDE 2 heavy people. Sturdy steel frame . . . buggedly built throughout. **AUTOMATIC CLUTCH** . . . positive brake . . . comfortable 5" sponge rubber seat. **100 MILES PER GAL.** Speed up to 35 mph. Powerful 2 cycle, 2 cylinder engine.

ONLY $189.50. Order through your dealer or direct from



ARGYLE MANUFACTURING CO. COLCHESTER, ILLINOIS

NEW JET BOOK

"JET AIRCRAFT SIMPLIFIED" is the first *easy-to-understand* book on jet aircraft and rockets. Explains basic principles, applications, engine design details and operations. 125 beautiful photos and drawings of newest airplanes and engines.

10-DAY FREE TRIAL
($3.75 Hardbound cover——$2.75 Flexible cover)
Aero Publishers, 2162 Sunset Blvd., F 9, Los Angeles 26, Calif.

AIR FORCE PILOTS, EX-PILOTS

Your wings in miniature for the lapel. Wear this proud, modest reminder of your flying days. Sterling ½" wide. Price $2.00 Tax Included.

WINGS P. O. Box 621 Longmont, Colorado

AERONAUTICAL UNIVERSITY

FOUNDED BY CURTISS WRIGHT

Be essential to an essential industry

• The aircraft industry urgently needs trained experts. YOUR opportunities for a career in aviation are greater than ever before.

Prepare now for a rewarding and interesting future at Aeronautical University, one of America's oldest recognized aeronautical schools.

Enroll for one of the following courses:

• Aeronautical Engineering • Aeronautical Eng. Drafting

• Airplane and Engine Mechanics

(Approved by U. S. Government C.A.A.)

Classes are scheduled so you may earn-as-you-learn through part-time employment. Placement service. Approved for civilian and G.I. training. Big demand for graduates. Write for free bulletin and "Careers in Aviation."

AERONAUTICAL UNIVERSITY, Dept. 2, 1905 S. Prairie Ave., Chicago 16, Illinois

I Learned About . . .

(Continued from page 38)

unaware of it but by this time he already had me in a bit of an uproar. As I get older and fancy myself getting craftier at this racket, the business of direct flying is something I am increasingly prone to leave to the more intrepid birdmen. Overseas, or when I have no other recourse, sure; but going direct, when Stateside, is nine times out of 10 like sneering at a multi-million dollar highway in order to take a beat-up back-pasture road. You might say 10 or 15 minutes but you'll dope off the time in the snack bar at your destination anyway.

It was a nice day, as I said earlier. One of those days when you are almost reluctant to take flight pay. Almost. The broken clouds over south Texas gave way to scattered to clear by the time we reached the northern part of the state. The air was smooth at 7,000 and the visibility good. By this time I had even managed to draw free-hand a reasonable facsimile direct course from Kelly to Scott on my charts. But every time my eyes strayed to the clipboard and my meticulously worked out flight plan my blood pressure fluctuated a little.

As originally planned, the trip called for 5 hr. 50 min. We were fairly close to being on time after we had passed the halfway mark, so I began to let the pressure in my boiler go down a little. That was my first mistake. Every so often I would run a radio check on our position using the ADF indicator of the radio compass. So far everything had been routine. Then the visibility began to drop almost imperceptibly as we encountered smoke and haze over the mountains in Arkansas. I didn't pay any particular attention to this fact, and when I assumed our position to be about 30 miles out of Advance Radio, I called in and gave a position report.

After the range station operator at Malden acknowledged (I had forgotten that Advance Radio no longer had low frequency or high frequency voice facilities), I switched the radio compass selector switch to the antenna position and tuned in Scott AFB Radio. The BLV identification signals came in loud and clear.

Happy as a jackass eating cactus, I placed the selector in the automatic position and aimed the airplane in the direction the needle was pointing. I didn't know the exact course from our present position to Scott, but I was sure that it couldn't be more than a couple of degrees one way or another from the heading indicated by the ADF. It was at about this point that the situation began to deteriorate.

When I estimated that we were about 10 minutes out of Scott I began to let down. By doing this I expected to be over the field at approximately pattern altitude by the time we arrived. What I didn't know is that 30 minutes later I would be over I-don't-know-where, still looking for Scott AFB. Four or five minutes went by and we were at 4,500 descending as nicely as you please at 500 per minute. I began to peer ahead. More than 20 minutes later I was still peering. Meanwhile that ADF needle was pointing straight ahead like the best bird dog you ever saw. I know now that we must have passed almost directly over the station at about this time, but I never saw the field. I switched to B channel, VHF, to see how well I could hear the Scott tower. It was coming in so strongly I almost ruptured an ear drum.

Ten minutes after the crude ETA I had set for Scott had elapsed I began to wonder what was going on. The Old Man was relaxing in the right seat with his eyes closed, probably envisioning a nice hot cup of coffee since our heaters hadn't been working, and as yet I was getting no static from him. But from the lack of progress I was making I had a feeling that said static wouldn't be long in coming.

★ FLYING TIP ★

LAST WINTER'S severity caught Grimes Field at Urbana, Ohio, without adequate heated space for my Cessna 195. The hangar had a heat duct on the ceiling with two open elbows pointing down. This arrangement was far from adequate, so an ingenious mechanic rigged a piece of stovepipe and an elbow from one of the outlets directly to the nose of the 195. A blanket to hold the heat in the engine compartment completed the improvised set-up.

The temperature of the hangar remained at an outside reading of 15° below zero, but the engine temperature was maintained for easy starting by the shop furnace via the pipe. My plane started right up after a night of this treatment.

The ductwork on a hangar ceiling with a few flexible tubes hanging down to stuff into the engine compartments of airplanes does the job of a heated hangar without the high fuel bill.

—L. E. Johnston

As I said earlier in this True Confession, I had flattered myself with the delusion that I was a pretty crafty aviator. Normally I plan my flights carefully, inspect the airplane, check the radios, and almost but not quite stick the gas personally. In short I make it a habit to do everything possible to enhance my own longevity as well as that of the unsuspecting individuals who ride with me. Seven thousand hours, most of it in twin- and four-engined equipment, hasn't made me feel any more secure in an airplane than I felt the first time I ever rode in one of the infernal machines. And personally I don't believe the airplane will ever replace the boudoir. Here I was, getting more overdue every minute, my destination not even in sight, with a vague feeling beginning to permeate me that I had tied up someplace. And yet that damn little ADF indicator continued to point almost joyously ahead.

By this time I was about ready to doubt my own hearing. Maybe I hadn't really heard Scott Radio after all. Perhaps I only thought I had. I switched the radio compass selector switch back to the antenna position and listened intently. The Old Man showed signs of coming to life about this time, and after cocking his wrist and taking a look at his watch he quickly picked up his headset and eavesdropped on the reception I was getting. The BLV of the Scott Range was unmistakable. I looked at him, and he looked at me.

I then turned the selector to the manual loop position and got a perfect null in both the 0° and 180° positions of the indicator. To carry the thing further, I threw caution to the winds and confirmed the Old Man's suspicions as to what was going on by working a quick 180° ambiguity problem. Meanwhile the Old Man regarded me with what could be construed as a growing animosity, but he had enough sense not to start grabbing for the controls. I gave him a quick rundown on the situation with an affected nonchalance that would not have fooled a five-year-old.

It dawned on me about this time that I had taken off with only 700 gallons aboard. That would have been plenty—plenty that is if I hadn't gotten off on an aerial survey of the eastern midwestern states of America. Somehow I had conveniently managed to repress this gruesome fact until now, but it was staring down my throat at the moment. As the aviation psychologists would have it, another variable had been introduced into a situation already full of stress. And what a variable!

The 180° ambiguity problem I worked using the manual loop position of the radio compass supported me nicely. As far as that little needle was concerned, Scott Radio was still dead ahead. Now admittedly I am a soul who normally takes a lot of convincing. However, in this instance I felt being 30 minutes overdue was more than adequate for me to form the conclusion that everything was not Kosher. I tried the easy out by switching to VHF and asking Scott for a steer to the base. No dice. The DF equipment was out for maintenance. I tried straining my eyes some more, but that didn't help either. All of the looking I had done through the windshield and out of the cockpit side windows since the expiration of the ETA hadn't paid off in the slightest. The little towns below that had grown up as units of a surveyor's measurements had a distressing sameness about them from the air. Air markers were conspicuous by their absence.

I finally got around to turning my low frequency beacon receiver on. I lined up 209 kilocycles nicely, and that STL of the St. Louis range sounded better to my reaching ears than a maiden's "Yes." The N was the loudest of the two quadrant signals, but the dit-dah of the A was readable also. My concern over my dwindling gasoline supply, together with the fact that I had maintained a constant heading long after my ETA at Scott had expired, determined the next move for me. Under the circumstances I made the only logical assumption I could and based my sub-

UNIVERSITY OF MICHIGAN LIBRARIES

quent actions on the belief that I was in the northeast quadrant of the St. Louis range. I made a double rate turn and took up the inbound heading of the bisector of the northeast quadrant of that station. For an interminably long while there was no appreciable change in signal strength or background. Finally, the volume began to build up gradually. My confidence began to return and tried a weak smile which quickly withered and died under the Old Man's I-smell-something-nasty look.

Soon after the build-up in signal strength had reached encouraging volume, we crossed the northeast course of the St. Louis range. I verified our position with a quick 90° orientation, and then took up the inbound heading of the leg. At the low altitude at which we were flying the winds were out of the west and strong, but rather than sacrifice any gasoline in a climb I plugged along at 2,500. Using my beacon receiver, to hell with that radio compass. I checked our position at the St. Elmo Intersection, which is where the northeast leg of the Scott range crosses the northeast course of the St. Louis range.

In about 15 minutes, spent in very careful bracketing of the Scott range, northeast leg that is, the field came into sight. Executing one of the shortest patterns in the memory of the Scott tower operator, I got the old girl on the deck and eased her up to the line behind a jeep with a sign on the back reading "Follow Me But Don't Push." I had seen this same type of sign many times before, but for some strange reason it looked particularly good to me that afternoon. Thirty gallons of gasoline isn't much in a Charley 47.

As we dropped our safety belts, I said to the Old Man, with feigned jocularity, "Well, we made it." To this day I am not sure what his rejoinder was, although I do know that it sounded suspiciously like, "Drop dead." I sidled out of the airplane well behind him as he took off for a staff meeting that had been set up for an hour earlier. We'd made it all right, but my knees still feel a little rubbery when I think of how close I came to terminating a fairly pleasant relationship with the Air Force. Understandably, the brass takes an exceedingly dim view of aviators who insist on getting lost on virtually CAVU days, run out of gas, and then bust up a perfectly good airplane.

After pulling myself together, and changing my shirt for one that was dry under the arms, I headed for Communications to ask some questions concerning the peculiar behavior of my ADF. Normally I use only the antenna or manual loop positions of my radio compass, and I hate to think of the number of students I have instructed never to rely on the blankety-blank thunderstorm hunting needle unless they are using it in conjunction with other radio aids. The one time I violated my own precept I had been had.

To make a long story short, Communications was not surprised at my story. It seems they had heard it before. Their explanation was that, for reasons unknown to them, the sensing antenna of the radio compass displayed a failing to detect signals from the Indianapolis Range which, although some 200 miles from Scott, was putting out with a power of more than 150 watts on a frequency only three kilocycles above that of Scott's 263 kcs. Other antennae responded to Scott Radio when the tuning coils were aligned on the Scott frequency. Since the sensing antenna of the radio compass actuates the ADF feature of that set, the needle pointed to the Indianapolis transmitter in response to the strong signals from that station. No one was able to inform me whether the altitude of the Kennelly-Heavyside Layer at the time, or some atmospheric disturbance, or a peculiarity of set installation was responsible for what had taken place.

Of course the "explanation" of the Scott Communications people gets me off the hook, but not as neatly as I should like. The fact remains that, in considerable measure, my predicament arose from the fact that I violated a number of sound rules which apply to any flight. In the first place, I should never have let the Old Man stampede me into the airplane after causing me to discard a detailed flight plan for a non-existent one; in the second place I should have insisted on refueling before departure; in the third place I should have utilized all radio equipment on board the airplane, enough to get around the world in comfort, instead of pinning the success of the entire trip on one little needle worth about four cents wholesale; and last, I should have been working on my pilotage instead of relying solely on my radio to get some place. I could mention the fact that I should have perpetrated the entire fiasco at some time other than when my boss was on the airplane, but I won't. END

☆ FLAT SPINS ☆

At Dishworth, England, a Royal Air Force officer was court martialed on a charge of becoming unduly familiar with WRAF midriffs. Two attractive members of the Women's Royal Air Force declared that he had welcomed them to his command by forcing them to the floor, pulling up their shirts and rubber-stamping his unit's name on their bare midriffs.

Life's Little Ironies Dept.: A British pilot with the Danish Airlines on the Copenhagen-London run made a carpet and entered it in a contest, winning first prize—a free air trip to London.

How Air Age conscious can you get? In Grand Rapids, Mich., A. P. Theopile received an airmail, special delivery letter from his bank—a block from his office.

A very peeved Commie soldier in Korea aimost brought down an American fighter plane by chunking a rock. Lieut. Ellison E. Carroll, Tulsa, was strafing enemy troops when a Red pitched a rock at him. It landed in the mouth of his F-51 Mustang's cooling system. Lieut. Carroll reached his home base just as the temperature gauge climbed into the red danger area.

Didja know? The first air combat occurred in World War I when a British pilot flew over a German plane and shot at it with a revolver.

The first cold war air raid test in Sharon, Mass., was labeled a success after three planes buzzed the streets and fireworks were exploded over the town. But one of the citizens nonchalantly took all the fuss in stride with: "I thought it was the children playing down in the cellar."

—*Harold Helfer*

ENGINEERING DEGREE IN 27 MONTHS

INDIANA TECHNICAL COLLEGE

B.S. DEGREE. Aeronautical, Chemical, Civil, Electrical, Mechanical and Radio Engineering (inc. television). Drafting. 1-yr. Gov't approved for G.I.'s. Low rate. Earn board. Large industrial center. Students from 48 states, 21 countries. Demand for graduates. Enter Sept., Dec., March, June. Write for catalog. 129 E. Washington Blvd., Fort Wayne 2, Indiana.

Confused by Computers? Let the
DRIFTABULATOR
Provide Your Drift Correction and Speed Component at a Glance

Simple Decals Fit Inside Scales of Weems Plotter, or on Instrument Panel. 4 Driftabulators Cover Air Speeds from 81 to 180 MPH.

Available in Sets of 2 for Airspeed Ranges: 81-110, 95-135, 110-180 MPH. 1 Set $1.00. State Range Desired. All 4—$1.50.

Send Check or Money Order
Discount to Operators
WIDGER-PITMAN ASSOCIATES
222 West 83 St. — N.Y.C. 24, N.Y.
Dept. F

MEYERS MODEL "145"
★ 162-mph. cruising speed
★ 600-mile range
★ Lands at 42 mph. with flaps
Write the factory for Literature
Meyers AIRCRAFT CO.
TECUMSEH, MICHIGAN

OPERATION SURVIVAL

By ED HOADLEY

DISCUSSIONS and arguments concerning the outlook for airports have heated the atmosphere for many months now. The warm fronts of optimistic airplane sale's managers have mixed with the cold fronts of dejected airport operators and disgusted aircraft owners. The combinations of hot and cold air have caused varying pressures that have made for much clouded aeronautical thinking.

The problem: Where is the operator today?

We have passed through that wonderful phase of post-war ambition. The bubble has burst. Operators all over the United States have shut their hangar doors. Airports are still closing. As we all sober up from our G.I. party we are faced with one thought: How can we keep our operation open?

To digress for a moment, we have a Great Dane dog living with us on the airport. His name is "Duke." He is friendly, loyal, and lazy. When not begging for food, scratching fleas, or romping with an occasional student, he lies in our office, moodily observing people and things. As my brother once sagely observed, "Duke was born tired."

I am wondering if we operators are not somewhat like Duke. Uncle Sam provided our meals at the proper time and all we had to do was to scratch V.A. fleas, and romp with an occasional student.

For a couple of years we had a wonderful time. Now we have to scrounge for food, and life is not quite so rosy. If Duke's food were restricted one suspects that he would get out on the airport and hunt for rabbits. Isn't it about time we operators went after the rabbits?

On visits to the various airports in the middle-west, I am struck by the good and bad attitudes among operators. Some are complaining about lack of business; others are out getting business.

Bob Shank in Indianapolis passed through the economic "doldrums" of the "thirties" and went out after business at that time. Now what's he doing? He's out after the rabbits again. He has built a grand airport northwest of Indianapolis.

With careful planning and foresight he has constructed almost 20 new "T" hangars per year since the war. His shop and leased operations have one motto—"Service."

Specializing in Beech sales and charter service, the Hunter Flying Service in Cedar Rapids has expanded instead of contracting its facilities. Elmer and Mel Schmidt of the Cincinnati Aircraft Service, Cincinnati, O., have gone right ahead with their plans for even better aircraft maintenance.

Some operators have moved in on allied fields of endeavor. Bill Ong, Ong Airport, Kansas City, Mo., is promoting a fine line of sprayers and dusters. Bob Euding, George Field, Lawrenceville, Ill., is getting along by aerial application of nitrogen fertilizer. "Pop" Mullendore, Franklin, Ind., is hauling radio parts and reports success. From Texas we hear of C-47s being used to haul roses to eastern markets.

The "Flying Club" market is not being overlooked by successful operators. Garrett Miller, Miller Airport, West Nyack, N. Y., is making the airport hum with his ideas on flying club organization. "Chuck" Farnum of United Aviation, Detroit, is making good money on a unique aerial photography proposition. All the fellows mentioned above are refusing to be licked. Can you add to the above list?

The point is this: Are we to sit around our collective offices begging for food that has been discontinued, or are we to get out and hunt for business? Shall we emulate the dog "Duke," or shall we get out and chase rabbits? Aviation is worthwhile, and since we've gotten this far down the road, let's organize a few economic "rabbit" expeditions. It will pay off, so "Good Hunting." END

Photo Credits

The following list shows the sources from which photographs and illustrations in this issue were gathered. Where a single page is indebted to several sources, credit is recorded left to right, top to bottom:

4—A. V. ROE CANADA LTD.
7—NORTHROP AIRCRAFT, INC., COPL. WAYNE D. FETHER
10—CONSOLIDATED VULTEE AIRCRAFT CORP., BELL AIRCRAFT CORP., FIRESTONE NEWS SERVICE
13, 14, 15—WILLIAM GREEN, JOINT ARMY NAVY TASK FORCE, GENERAL ELECTRIC CORP., REPUBLIC AVIATION CORP., BOEING AIRPLANE CO., LOCKHEED AIRCRAFT CORP.
16, 17—CHARLES W. CAIN
18, 19—A. V. ROE CANADA LTD.
20, 21—USN, GRUMMAN AIRCRAFT CORP., USN
22, 23—USAF
25—RUTH BALLARD
26, 27—RAWDON BROS. AIRCRAFT CO.
28, 29—REV. CURRAN L. SPOTTSWOOD
30, 31—USAF
32, 33—FLYING, ALICE S. FUCHS
34—GILBERT C. CLOSE
35—BELL AIRCRAFT CORP., TAYLORCRAFT, INC., HANS GROENHOFF
36—NORTH AMERICAN AVIATION, INC., BOEING AIRPLANE CO.
37—HOWARD LEVY, GRUMMAN AIRCRAFT ENG. CORP., HOWARD LEVY, BRITISH INFO. SERV., SAAB-LINKOPING, GRUMMAN AIRCRAFT ENG. CORP.
38—LIEUT. COL. VINCENT J. DONAHUE
40—AOPA
46—MITCHELL INDUSTRIES, PACIFIC AUTOMOTIVE CORP.
50—GORDON S. WILLIAMS, SIKORSKY AIRCRAFT, GORDON S. WILLIAMS
52—ALICE S. FUCHS
55—BETTY SKELTON, LEE HUNT, USAF
56—DOUGLAS AIRCRAFT CO., INC., CHARLES W. CAIN, CHARLES W. CAIN, INTERNTL. NEWSPHOTO, CHARLES W. CAIN, CHARLES W. CAIN, BOEING AIRPLANE CO., CHARLES W. CAIN, CHARLES W. CAIN, COSTRUZION AERONAUTICHE
64—ACME PHOTO

The Mail Box

(Continued from page 41)

Schwarzenbach's critique should be partially-well taken, since his company's propeller was not used. I have compared several standard U.S. Propellers with other makes, and know that he produces a fine prop. However, in the Flex-O-Prop, as in the MacArthur-Truman controversy, who is right depends only on who you are arguing with. My curbstone opinion of propeller engineering is that it is only relative . . . therefore may I request an engineer's answer—that of Dr. Munk himself."—ED.

NEGATIVE REVERSE

In "I Joined an English Flying Club" (FLYING July), I noticed, probably among 1,001 other readers, that, the author said that the only difference in flying British planes was their opposite prop-rotation to American planes. The picture of the plane he flew was definitely sporting a right-hand prop.

FRED CAMPHAUSEN

● *Yes, we were certainly caught by our readers with our prop reversed. A reversed negative is at fault, not author Bennett L. Jackson.*—ED.

STALL RECOVERY

V. A. Foster's "Best Ways to Stop That Stall" (FLYING July) says "in the near future, the CAA inspector may not pass you" unless you learn on-horizon stall recovery. Clinton Aviation at Denver, for some months, has taught on-horizon recovery as the best method for power-on stalls, and Examiner Jack Miller won't okay that commercial check ride unless you know it.

P. S. I passed it.

ALLAN PALMER

Denver, Colo.

Is a special issue for the Navy or Marines being planned for 1951?

STAVERT SWANBERG

● *Yes, a special U. S. Navy issue of* FLYING *is scheduled for November.*—ED.

SPELLBOUND

I was very interested in FLYING July issue account of Gromov's flight across the North Pole in the ANT-25. This was a wonderful achievement for the time. In order to keep the record straight, however, I would like to make some spelling corrections:

Schelkovo should read Shchelkovo
Yumoshev should be Yumashev
J. Schmidt is really Otto Yule 'vich Shmidt
J. Alksmis is Ya.U.Alksnis

Incidentally, the photograph on page 44, labeled YaK-9, is in fact one of the first photographs released of the YaK-7B. I think the Russians cannot have any identification of them, and they were immediately labeled officially in the West as being of YaK-9. The YaK-9, which appeared later, had neater undercarriage, blunter wing tips and other details differences.

DENYS J. VOADEN

Devon, England

UNIVERSITY OF MICHIGAN LIBRARIES

par-
ny's
ared
with
ices
rop.
rsy.
are
n of
only
t an
im-

lub"
ong
said
tish
n to
lane
ght-

EN
our
re-
thor

That
neat
pass
re-
for
re-
-on
on't
less

ER

Ma-

IG
TY-

uly
oss
was
me.
ow-
ing

o

ich

nge
the
7B.
ny
im-
est
ich
ge,
lif-

)51